Hughes 9211

User Guide

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Contents

Messages concerning personal injury v
Messages concerning property damage v
Introduction 1
Overview 1
About this User Guide 2
Package Contents 3
Minimum System Requirements for Laptop/PC 5
Getting Started 5
Using the Hughes 9211 6
Setup 6
LCD Quick Start 7
Web UI Quick Start 8
Connecting the terminal to the computer 11
Connecting by Ethernet 11
Connecting by WLAN 11
WLAN Security 12
Connecting by RJ11 13
Dialing and Numbering 14
External Antenna 14
Coverage Map 15
Using the LCD and Keypad 17
LCD Display and Keypad 17
Terminal Buttons 17
LCD Status Display 18
Pointing mode display 18
Audible pointing indicator 18
Exit Pointing and Registering with the network 19
Idle mode display 19
Connection mode display 19
Status messages 20
Menu Navigation 21
Display Icons 23
Battery Icon 23
Power Icon 23
GPS Icon 23
Satellite Icons 23
Wireless LAN Icon 24
Wireless LAN Lock Icon 24
Globe ICON 24

SIM PIN entry 24
Multiple Users 25
Information Messages 25
Using the Web UI 27
Accessing the Web UI 27
Home page 28
Connections 30
Manage Contexts 31
Automatic Contexts 33
Manage APNs 36
SMS 39
Send/Receive 39
Saved Drafts 39
Sent Messages 41
SMS Settings 42
Settings page 43
General Setup 43
IP Address/DHCP Settings 44
Nat Mode 45
Relay Mode 45
Wireless LAN 46
Wireless LAN Security 47
Telephony 49
Security 50
Features 52
Usage Page 53
Support Page 54
Support and Information 55
Troubleshooting 57
Technology Overview 60
GPS 60
Obtaining a GPS Fix 60
GPS and BGAN Registration 61
Dialing and Numbering 61
PDP Context 61
Technical Specifications 63
Declaration of Conformity 64
FCC Compliance 65
EU RoHS-2 (Restriction of Hazardous Substances) Directive 66
EU WEEE (Waste Electrical and Electronic Equipment) Directives 66
Glossary 67
Application Note – Phone/Fax 70
Application Note – Battery 72

Understanding safety alert messages

Safety alert messages call attention to potential safety hazards and tell you how to avoid them. These messages are identified by the signal words DANGER, WARNING, CAUTION, or NOTICE, as illustrated below. To avoid possible property damage, personal injury or in some cases possible death; read and comply with all safety alert messages.

Messages concerning personal injury

The signal words DANGER, WARNING, and CAUTION indicate hazards that could result in personal injury or in some cases death, as explained below. Each of these signal words indicates the severity of the potential hazard.

DANGER indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in serious injury.

CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

Messages concerning property damage

NOTICE is used for messages concerning possible property damage, product damage or malfunction, data loss, or other unwanted results—but *not* personal injury.

Safety symbols

The generic safety alert symbol calls attention to a potential personal injury hazard. It appears next to the DANGER, WARNING, and CAUTION signal words as part of the signal word label. Other symbols may appear next to DANGER, WARNING, or CAUTION to indicate a specific type of hazard (for example, fire or electric shock). If other hazard symbols are used in this document they are identified in this section.

Additional symbols

Warning Potential Radio Frequency (RF) hazard. Where you see this alert symbol and WARNING heading, strictly follow the warning instructions to avoid injury to eyes or other personal injury.

Warning Where you see this alert symbol and WARNING heading, strictly follow the warning instructions to avoid personal injury.

Danger Electric shock hazard: Where you see this alert symbol and DANGER heading, strictly follow the warning instructions to avoid electric shock injury or death.

Warnings for Satellite Terminal

Do not stand in front of the Antenna This device emits radio frequency energy. To avoid injury, do not place head or other body parts in front of the satellite antenna when system is operational. Maintain a distance of one meter or more from the front of the Satellite Terminal antenna.

General Handle your Satellite Terminal with care. The unit is weather resistant per IEC 60529 IP55; however, do not submerge the unit. Avoid exposing your Satellite Terminal to extreme hot or cold temperatures outside the range -25ºC to +60ºC.

Avoid placing the Terminal close to cigarettes,

open flames or any source of heat.

Changes or modifications to the Terminal not expressly approved by Hughes Network Systems could void your authority to operate this equipment.

Only use a soft damp cloth to clean the Terminal.

To avoid impaired Terminal performance, please ensure the unit's antenna is not damaged or covered with foreign material like paint or labeling.

When inserting the SIM, do not bend it or damage the contacts in any way. When connecting the interface cables, do not use excessive force.

In the vicinity of blasting work and in explosive environments Never use the Satellite Terminal where blasting work is in progress. Observe all restrictions and follow any regulations or rules. Areas with a potentially explosive environment are often, but not always, clearly marked. Do not use the Terminal while at a petrol filling station. Do not use near fuel or chemicals.

Qualified Service Do not attempt to disassemble your Satellite Terminal. The unit does not contain consumer-serviceable components. Only qualified service personnel may install or repair equipment.

Accessories Use Hughes approved accessories only. Use of non-approved accessories may result in loss of performance, damage to the Satellite Terminal, fire, electric shock or injury.

Battery Use only a battery approved by Hughes. Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

Connecting Devices Never connect incompatible devices to the Satellite Terminal. When connecting the Satellite Terminal to any other device, read the device's User Manual for detailed safety instructions.

Pacemakers The various brands and models of cardiac pacemakers available exhibit a wide range of immunity levels to radio signals. Therefore, people who wear a cardiac pacemaker and who want to use a Satellite Terminal should seek the advice of their cardiologist. If, as a pacemaker user, you are still concerned about interaction with the Satellite Terminal, we suggest you follow these guidelines:

- Maintain a distance of one meter from the main antenna front and sides and your pacemaker;
- Refer to your pacemaker product literature for information on your particular device.

If you have any reason to suspect that interference is taking place, turn off your Satellite Terminal immediately.

Hearing Aids Most new models of hearing aids are immune to radio frequency interference from Satellite Terminals that are more than 2 meters away. Many types of older hearing aids may be susceptible to interference, making it very difficult to use them near a Terminal. Should interference be experienced, maintain additional separation between you and the Satellite Terminal.

Electrical Storms Operation of the Satellite Terminal during electrical storms may result in severe personal injury or death

Introduction

Overview

The Hughes 9211 Land Portable Terminal is the latest Hughes BGAN product to provide reliable satellite connectivity over the Inmarsat BGAN satellite network. The Hughes 9211 comes in a very small and portable package, and it allows the user to take advantage of the new High-Data-Rate (HDR) bearers in the Inmarsat network. The terminal is optimized for transmitting HDR and uses standard BGAN bearers in the forward direction. You can send and receive IP packets via Ethernet and WLAN interfaces. In parallel with the packet data services, the Hughes 9211 supports circuit switched voice and fax calls via standard POTS interface.

The Hughes 9211 offers you the following features and benefits:

- Small, compact IP terminal with the following interfaces:
  - Wi-Fi access point (b/g/n) built-in

    - RJ-45 Ethernet port
    - POTS RJ14 port for voice and fax
    - External Active Antenna port
- SMS Remote Control, with over-air software upgrades
- Fully compatible with Remote Terminal Manager (RTM)
- Multi-user capability for sharing a single unit
- Selectable Quality-of-Service (QoS) up to HDR streaming
- Full IP compatibility for Email, file transfer (FTP), browsing, VPN, etc.
- Cost-effective "always-on" access – charges only for data sent and received
- UMTS IP-based services
- FCC and CE certified
- Subscriber Identification Module (SIM) card security

In this document, the following names and abbreviations are used to identify the Satellite Terminal and your computer.

Term	Definition
Terminal	Satellite Terminal
TE	Terminal Equipment (your computer)
UT	User Terminal/satellite terminal

About this User Guide

This user guide contains the most up-to-date information available on this product, on the date it was generated. It is focused on the specific information needed to operate the Hughes 9211 Land Portable Terminal.

For information on using LaunchPad, please refer to the Inmarsat website where a copy of the 'Inmarsat LaunchPad Guide' can be downloaded: **www.inmarsat.com/support**

Package Contents

When you unpack the Hughes 9211 Land Portable Terminal Kit package, you will find the following:

- Upper Level
    - AC/DC power adapter
        - US Power cord
        - EU power cord
        - UK power cord
    - Ethernet cable
    - Lithium Ion battery
- Lower level
    - Hughes 9211 terminal

Do not tear the plastic cover on the lower level where the 9211 terminal is housed. Lift the entire lower level up and unfold the side flaps to remove the 9211 terminal. This packaging can be re-used for shipping to other customers if needed.

Your Service Provider will supply you with a Subscriber Identification Module (SIM) and its PIN, and Satellite Terminal configuration instructions – you will need these to access the satellite network. Note: make sure the SIM card is provisioned for multiple PDP contexts to take advantage of the multiple users and remote management. The SIM card may also have two (2)

MSISDN numbers associated with it for various Circuit Switched services:

- 4K Voice
- 3.1KHz Audio/Fax

Minimum System Requirements for Laptop/PC

These are the minimum computer system requirements for successful interface with the Satellite Terminal:

- Internet Browser: Microsoft Internet Explorer (IE8 or above), Mozilla or Safari.
- PC Support for Ethernet or WLAN (802.11b or b/g/n).
- 100 MB of free hard disk space if using LaunchPad. Only LaunchPad version 5.0.7 or newer supports the 9211.

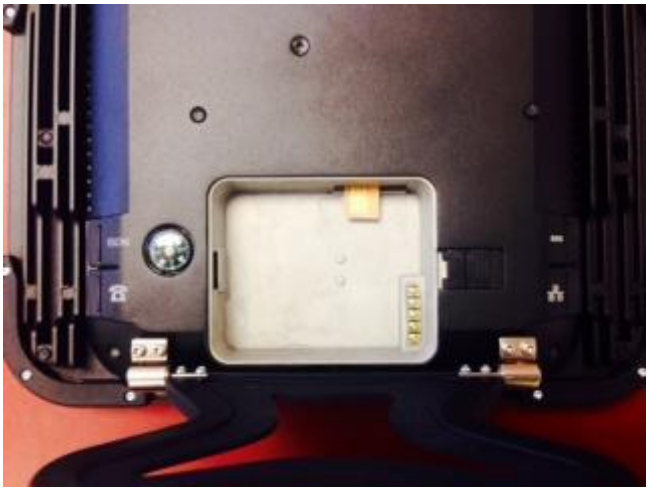
Getting Started

This guide is the simplest and quickest way to connect to the BGAN network. If you are a first time user, you will be guided through the procedure for powering up your terminal, obtaining a GPS fix, connecting your computer to the terminal and registering with the BGAN network. You are then ready to start using voice and broadband services.

Using the Hughes 9211

Setup

Remove the battery and install the USIM card supplied by your service provider in the battery compartment. The SIM card icon on the casting shows the proper way to install the SIM card.



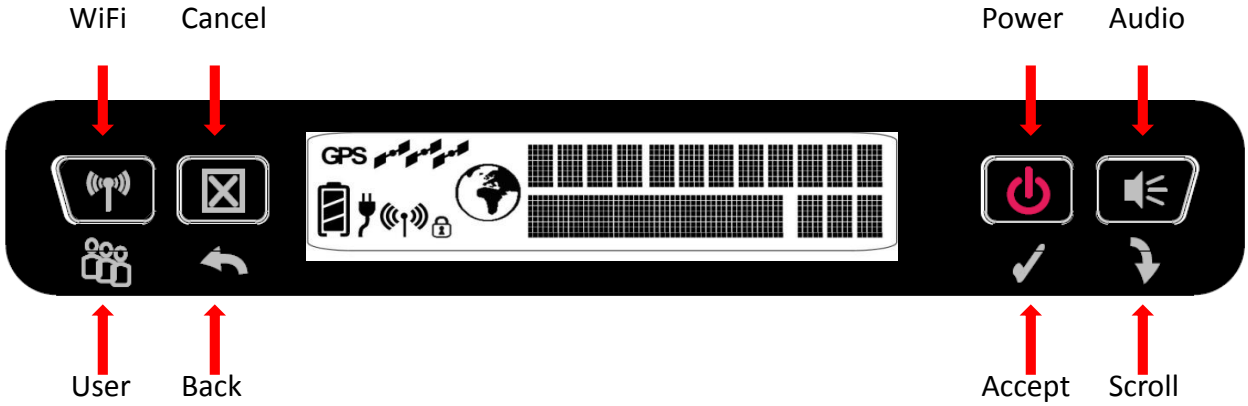
Install the battery in the terminal unit and then fully charge the battery using the supplied AC/DC converter.

LCD Quick Start

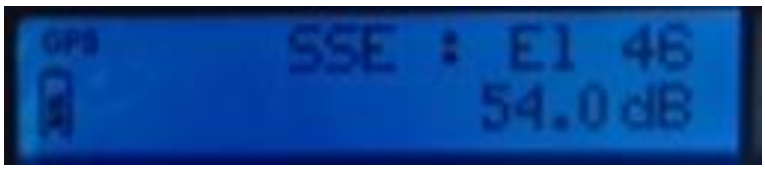
Pressing the power button for at least two (2) seconds in order to Power On the terminal. The LCD will display “Hughes 9211” for about 30 seconds while the terminal is booting up.

Since the Hughes 9211 terminal is a portable device, you must first obtain a GPS fix and then point the terminal to the Inmarsat satellite before setting up a data connection with the network.

You can use the LCD display to aid in pointing as described in *Using the LCD and Keypad* on Page 17.



The top line gives the compass bearing and elevation angle of the closest satellite.



Use the signal quality bar and numeric display on the lower line to help point the UT to the satellite. While in pointing mode, you may also activate the audio pointing aid by a long press of the audio button on the right.

Once you have accurately pointed the unit to the satellite (signal level of 52 to 55dB), exit pointing by a long press (>2 seconds) of the **Back** button. The unit will now attempt to register with the satellite network.

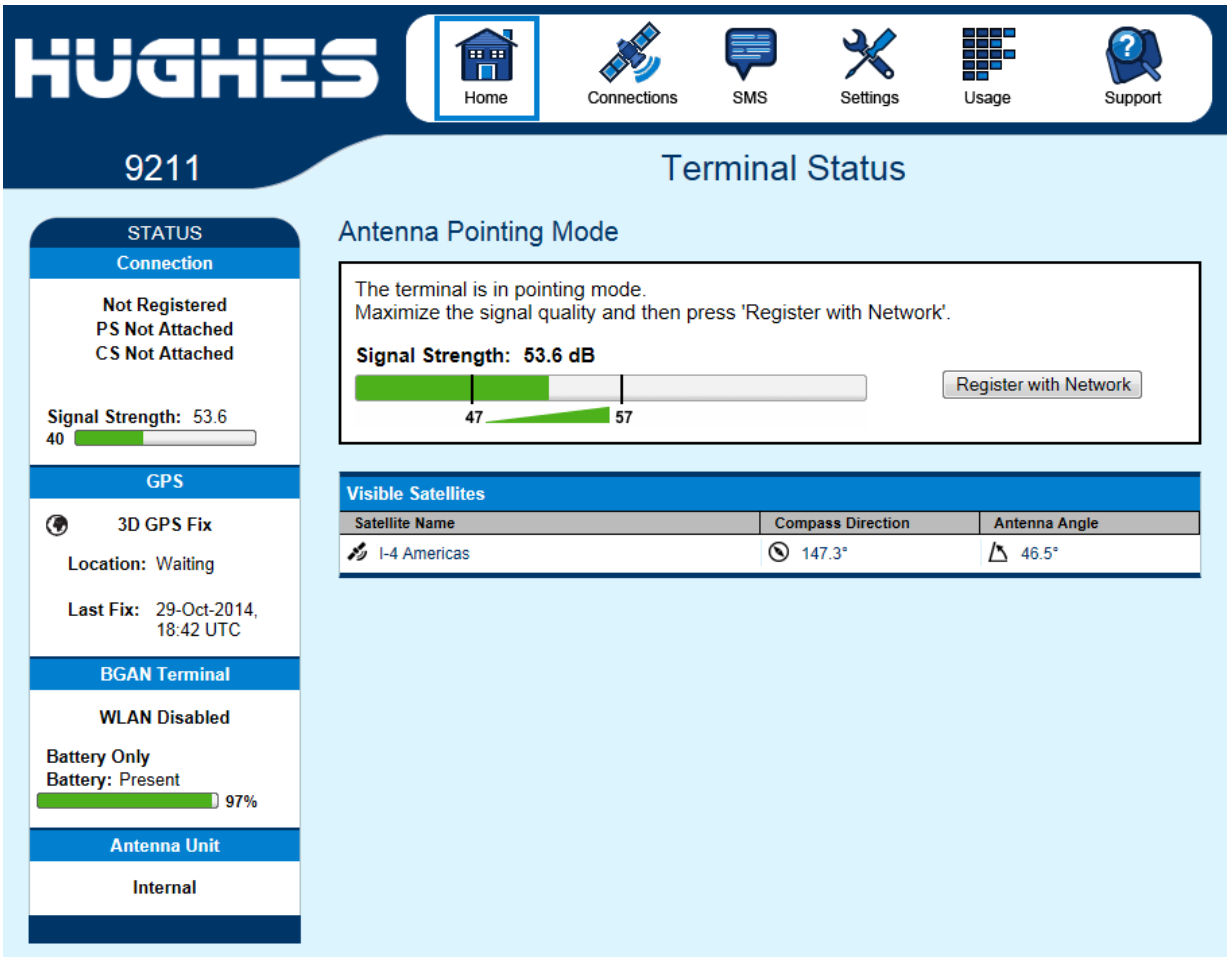
Once the unit has registered and is Circuit Switched (CS) and Packet Switched (PS) attached (“Ready” on the LCD), you can create a data connection from the menu by scrolling through the various selections and by pressing the “Accept” button

when the LCD says Connection. Scroll through the various QoS's and select the appropriate one for your application by again pressing the "Accept" button.

Web UI Quick Start

Alternatively, you can connect a computer and use the Hughes 9211's internal web server. From your terminal equipment (e.g. PC), enter 192.168.128.100 as the URL to access the Hughes 9211's home page. (See *Using the Web UI* for more details.)

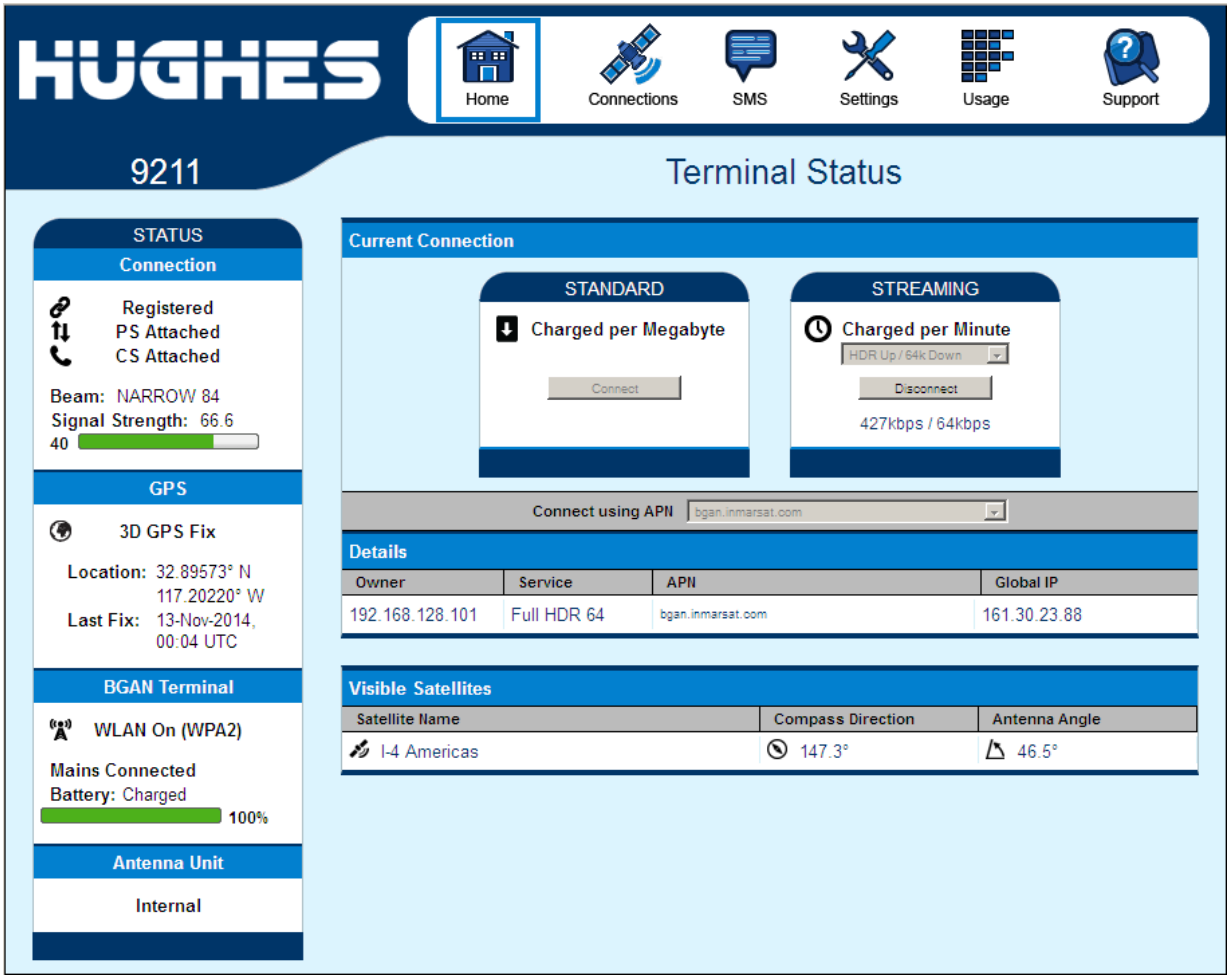
- The Terminal Status page gives you all the information you need to point and register with the network. Once you have a GPS fix and are pointed to the satellite as best you can, click on the **Register with Network** button to start the registration process.

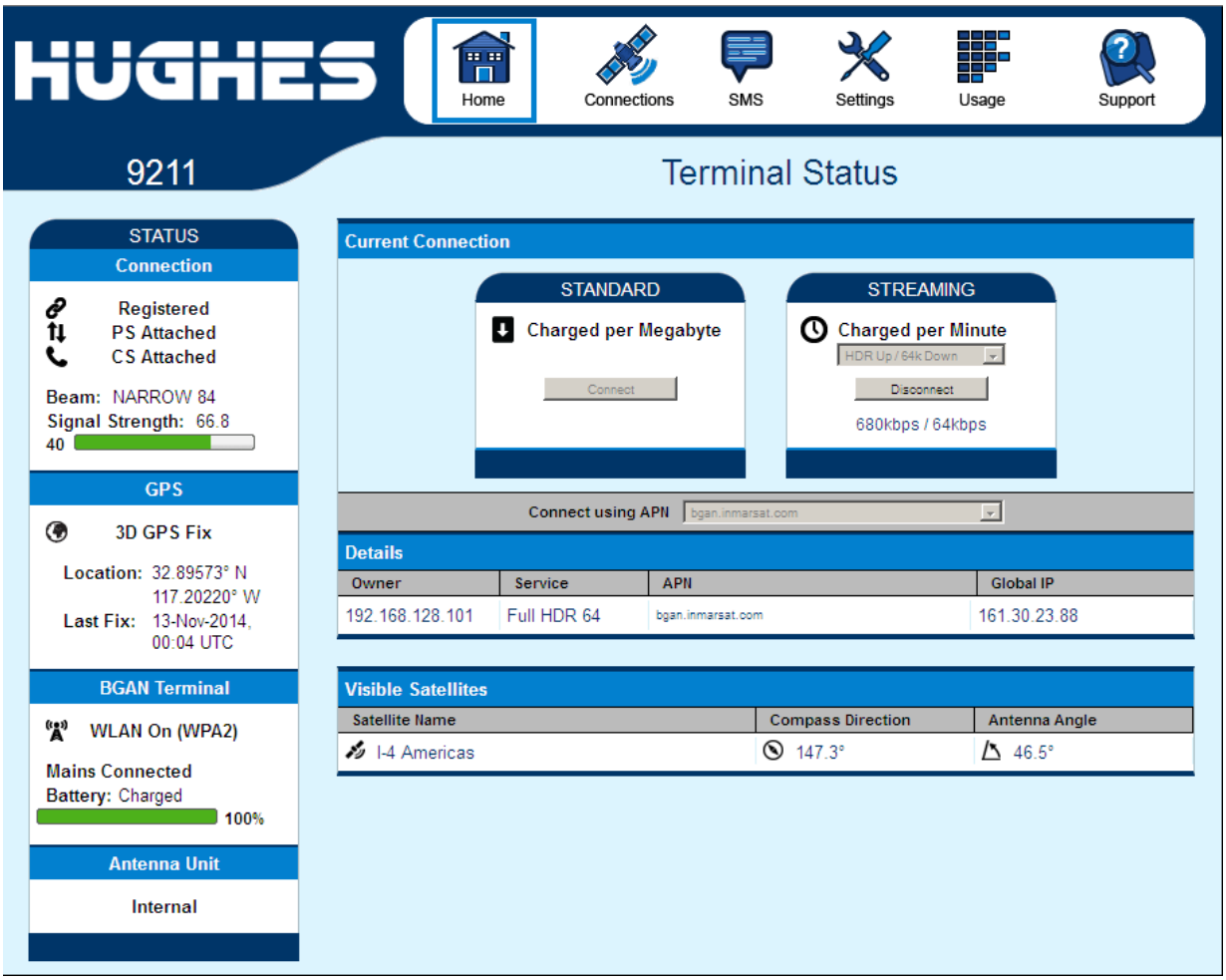


- Once you are registered and CS and PS Attached, you can then select the Quality of Service (QoS) for your data connection by choosing either the **Standard** or **Streaming** connection.
- The screenshot below shows a Full HDR asymmetric data session that has been selected and setup with the network.

NOTICE

- The bandwidth assigned to the terminal is shown as 427kbps / 64kbps which is the initial "reference" bandwidth. After a few seconds, or once the device starts to send data, a higher up link rate will be assigned, e.g. > 650kbps. The Web UI will dynamically show the available bandwidth. This information can be used to help with video codec settings for example.




HUGHES
Home
Connections
SMS
Settings
Usage
Support
9211
Terminal Status
STATUS
Connection
Registered
PS Attached
CS Attached
Beam: NARROW 84
Signal Strength: 66.8
40
GPS
3D GPS Fix
Location: 32.89573° N
117.20220° W
Last Fix: 13-Nov-2014,
00:04 UTC
BGAN Terminal
WLAN On (WPA2)
Mains Connected
Battery: Charged
100%
Antenna Unit
Internal
Current Connection
STANDARD
Charged per Megabyte
Connect
STREAMING
Charged per Minute
HDR Up / 64k Down
Disconnect
680kbps / 64kbps
Connect using APN
bgan.inmarsat.com
Details
Owner
Service
APN
Global IP
192.168.128.101
Full HDR 64
bgan.inmarsat.com
161.30.23.88
Visible Satellites
Satellite Name
Compass Direction
Antenna Angle
I-4 Americas
147.3°
46.5°

Connecting the terminal to the computer

You can connect your computer to the 9211 with one or more of the following interfaces

- Ethernet
- WLAN

Your computer must be configured to support your chosen connection method. Refer to the documentation supplied with your computer for details.

Connecting by Ethernet

To connect the Hughes 9211 terminal to a device using Ethernet:

- Connect an Ethernet cable to your device's Ethernet port, and insert the other end of the connector into the Ethernet port on the 9211.

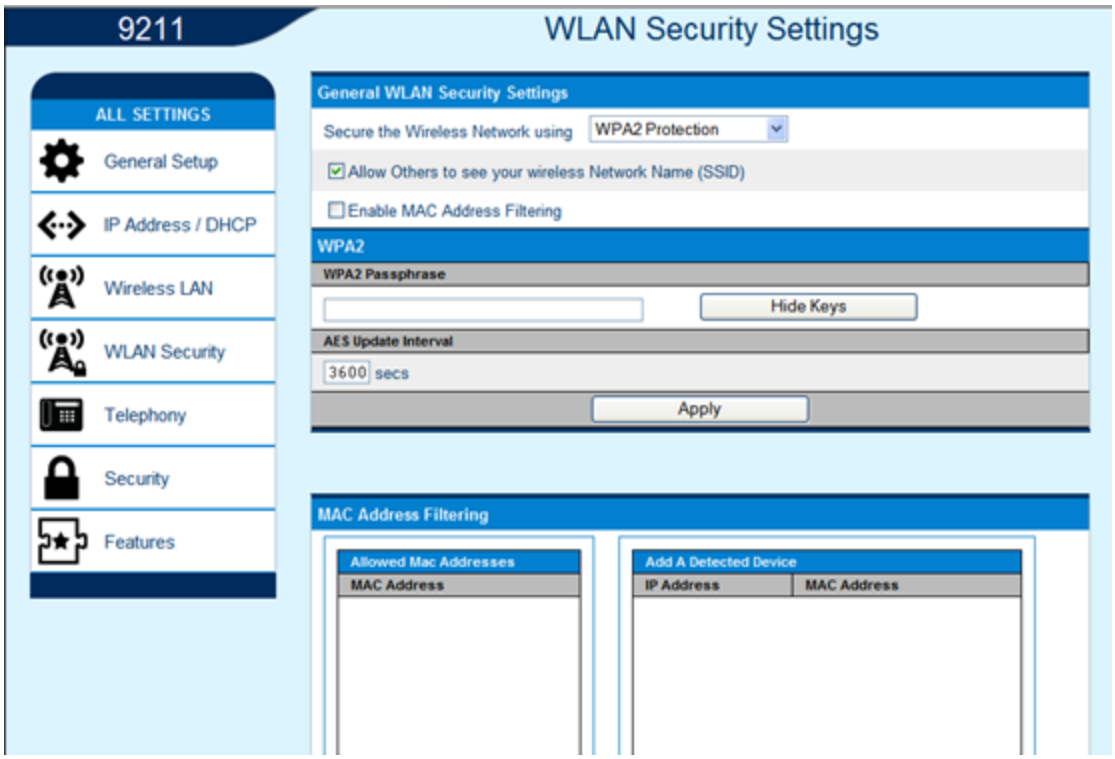
Connecting by WLAN

If you have not previously used the 9211's WLAN interface, it has to be enabled from the keypad or you can connect via Ethernet and use the internal webUI or LaunchPad.

During initial setup, you can turn on Wi-Fi by long pressing (> 2 seconds) the button. Once the icon shows solid on the LCD, you can continue to configure the terminal or setup a data session using your wirelessly connected device.

- WLAN Power: The default is off, which disables the WLAN feature.
- SSID (network name): The default is "Hughes 9211", but you can change it to whatever you want.
- Channel Number: This controls the radio channel number (1 through 11) used by the access point. To meet FCC regulations, channels 12 to 14 are not supported.

As you are configuring the WLAN, you can enable the Wireless LAN Encryption (WEP, WPA and WPA2), MAC address filtering, and no SSID broadcast features for added security.



NOTICE

Once the WLAN is "Enabled" and configured, any device with a WLAN interface can detect the 9211's WLAN SSID, and connect to it automatically.

WLAN Security

- Use the drop down menu to select the type of encryption that you want (WEP, WPA or WPA2)
- WEP Protection Status: Select WEP from the drop down menu.
    - Encryption Level: 64 or 128 bit WEP encryption can be enabled.
    - WEP Key: You can define the WEP key or use the default WEP key, which is formulated using the first 14 digits of the IMEI number of the terminal (e.g. IMEI number + 123456789AB).
    - Hexadecimal 128-bit: Requires 26 characters. Recommended
    - Hexadecimal 64-bit: Requires 10 characters

- WPA and WPA2 Protection Status:
    - Enter the Passphrase that you want to use and click on “Hide Keys” if you do not want to show the Passphrase.

NOTICE

- SSID Broadcast: For added security you can choose not to broadcast your SSID.
- MAC Filtering: For added security, check the box to “Enable” MAC Filtering. You can define up to 10 MAC addresses that are allowed to connect to your WLAN.

NOTICE

To determine the MAC address of a PC, go to a DOS prompt and type **ipconfig/all**.

For Mac OS X, under the Apple Menu go to **System Preferences -> Network** and **Show Airport**. The Airport Id is the MAC address. Alternatively, go to **About this Mac -> More Info -> network**, and select **Airport**.

NOTICE

When WLAN is enabled, unauthorized users may be able to access your BGAN service. If encryption is enabled, you must provide other WLAN users with the proper encryption key or passphrase in order for them to connect to the terminal. You can go to the **Manage Connections** page on the Web UI to see what computers are actually using the BGAN service.

Connecting by RJ11

NOTICE

You can connect an analog phone directly to the RJ14 port with an RJ11 cable to make voice calls.

If you wish to use the fax port you can connect an RJ14 connector that breaks out the two RJ11 ports into Line 1 and Line 2. You can then connect to port 2 to access the 3.1k service for fax (see Application Note at end of User Manual).

If you have a device that supports voice and 3.1 KHz/fax on a single line, you can configure the RJ14 port to support both services on line 1. On the **Telephony Settings** page, set the field "**Route incoming 3.1kHz/fax calls to**" "**RJ14 port 1**" and simply connect the device directly to the RJ14 port with an RJ11 cable. With this setting, all incoming calls are then routed to RJ14 line 1.

To initiate an outgoing 3.1kHz/fax call when connected to line 1, add a 2* prefix in front of the dialed number. For voice calls, no prefix is required, but the 9211 will accept a 1* prefix to indicate a voice call.

To receive incoming calls on line 1, change the Route incoming 3.1KHz/fax calls parameter on the Telephony Settings page to "RJ14 Line 1" using the drop down menu.

Dialing and Numbering

Dialing - As the BGAN numbering system follows the same pattern as the normal telephone system, dialing is carried out in exactly the same manner as making a normal telephone call. The subscriber number is used with the same international and area codes as any other telephone network. Start the dialed number with 00 and terminate it with #. If you are calling another BGAN unit, you need to dial 00 then the 870 number and then # to initiate the call.

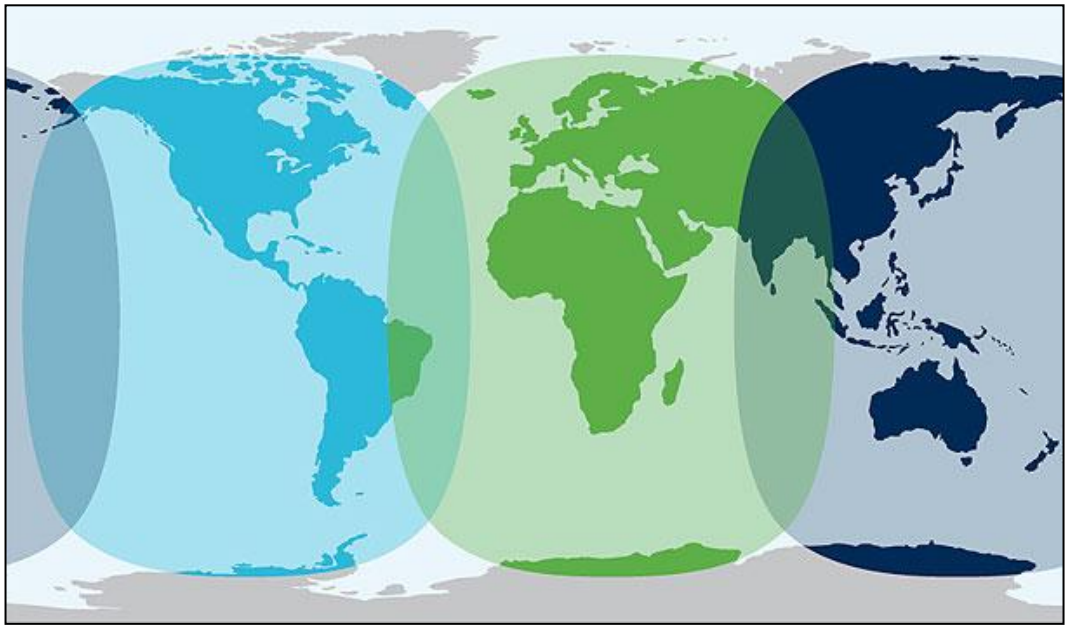
To dial, prefix the international number with 00 and terminate with #. For example, to dial a number in the USA, enter: 0018005551234# (00 + Country code + phone number+ #)

External Antenna

The 9211 terminal has an external antenna port that can be used (with a future software release) to connect the existing mobile antennas for Class 10 and Class 11 so that they can be used with the 9211 terminal to get comms-on-the-move (legacy data rates). Hughes is developing a Class 1 active antenna for use with the 9211 terminal that will provide asymmetric HDR data rates.

Coverage Map

The Inmarsat BGAN service is operated with 3 satellites as shown below. The Hughes 9211 terminal will perform best in areas where the elevation (or “look”) angle is 20 degrees above horizontal or higher, but the terminal can operate down to 5 degrees of look angle.

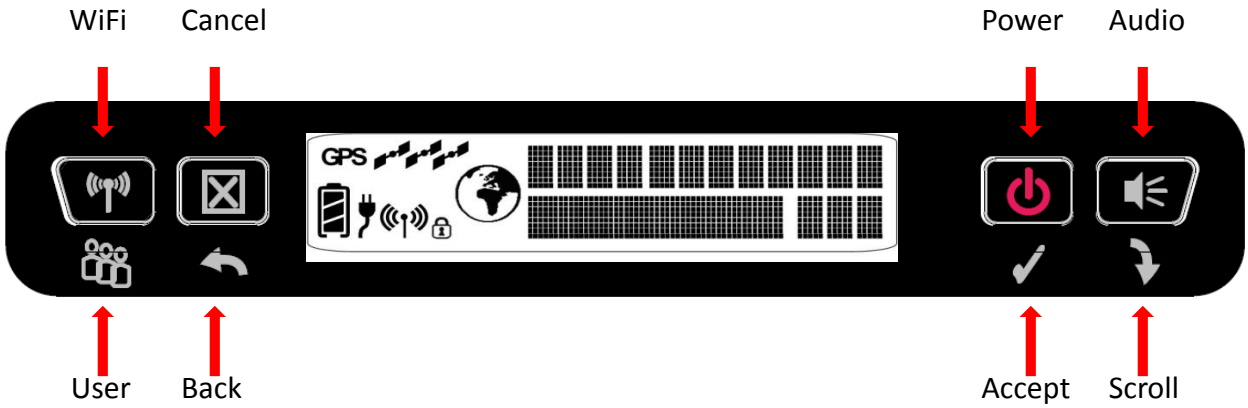


Using the LCD and Keypad

LCD Display and Keypad

The 9211 terminal has an LCD display that provides status information about the terminal. It has a four button keypad that allows you to control the operational features of the terminal without the need of a PC or a browser. It also includes control of an audible pointing aid integrated into the terminal.

The figure below shows the layout of the LCD and keypad.



Terminal Buttons

The UT provides four buttons for the user. Each button has two primary functions, one invoked with a short press and the other invoked with a long press. The top icon associated with a button is the long press function. The bottom icon associated with a button is the short press function.

Button Name	Short Press	Long Press
User / WiFi	Selects the user to display	Turns WiFi on/off
Back / Cancel	Up one level in menu	Exit pointing; Cancel to top menu
Accept / Power	Enters menu and confirms selection	Power on/off
Scroll / Audio	Scrolls through a menu or screen message	Audio on/off

A "**short press**" is any keystroke less than two seconds.

A "**long press**" is any keystroke that is two seconds or greater.

An "**extra long press**" of more than five seconds of the power button will cause a hardware enforced power down.

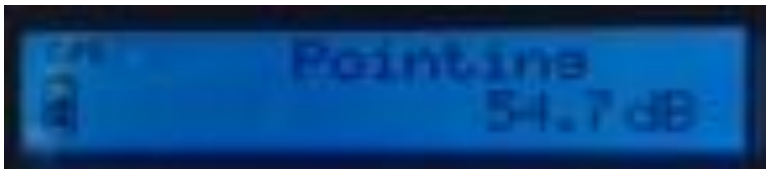
All buttons start or restart the backlight time period, even if they have no function in the current context.

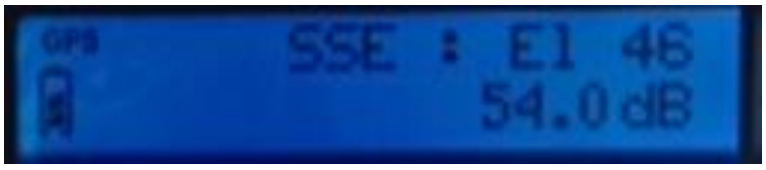
LCD Status Display

Pointing mode display

By default, at power up the LCD shows the pointing display. The top line alternates between "Pointing" and the compass bearing and elevation angle of the closest satellite. In the picture below, the satellite bearing is South-Southeast (SSE) and the elevation angle to the satellite is 46 degrees.

The lower line displays the received signal quality, both graphically and as a number in tenths of a dB. In pointing mode typical values are 52.0 to 55.0. The higher dB value that you can get, the better.





Audible pointing indicator

A buzzer provides an audible representation of the signal quality during antenna pointing. When turned on, the indicator emits pointing tones that increase in tempo and pitch as the signal strength increases. If the satellite is not found, one tone is followed by a pause. The indicator always defaults to off when the unit powers on.

Use a long press of the Audio button to toggle the audio pointing indicator on and off.

Exit Pointing and Registering with the network

Once you have accurately pointed the unit to the satellite, exit pointing by a long press of the Back button. This will cause the unit to attempt to register with the BGAN network (note: if audible pointing tones were enabled during pointing, they will automatically turn off once you attempt to register).

Idle mode display

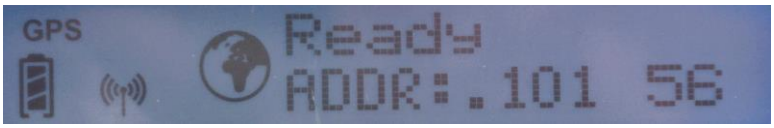
Once the unit exits pointing, it will automatically attempt to register with the network. During this operation it displays "Registering" on the upper line of the LCD.

Once it registers and is ready for PDP contexts, it displays "Ready" on the upper line.

Once it is ready for voice calls, it displays the globe icon (see below).

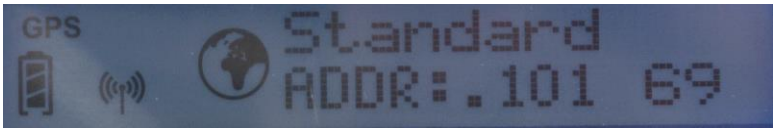
If user equipment is connected (via Ethernet or Wireless LAN), the lower line will display "ADDR:" plus the last octet of the IP address of the currently selected user terminal. If multiple devices are attached, you can select the others by pressing the user button.

The signal quality is shown as a number in the right corner of the lower line; typical values in idle mode are 56 to 60.



Connection mode display

When a PDP context is active, the type of connection is displayed on the upper line: "Standard", "Stream 32k", etc.



The lower line displays the "ADDR:" information and the current signal level as described above.

While in an active PDP context, typical signal level values are 66 to 71. However, if no data is sent or received for 90 seconds, the unit will return to the regional beam and the signal quality will drop to the idle mode range of 56 to 60. However, the PDP context will remain active.

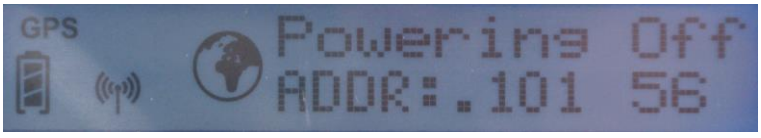
Status messages

The upper level of the LCD is used for status messages and menu items. Status messages are listed below.

Display	Description
HUGHES 9211	On screen during power up
Powering Off	Displayed while the 9211 is powering down
Too Hot	Unit is too hot; if not corrected, a temporary thermal shutdown may occur
Battery Hot	Battery is too hot; reduce temperature or turn off unit to avoid damage to the battery
SIM Error	SIM communication error
No SIM	No SIM is detected in the UT
SIM Blocked	The SIM is blocked due to too many SIM PIN attempts. Enter the PUK via the Web UI or LaunchPad to clear
Enter PIN	A SIM PIN code is needed (this can be entered via the front panel buttons)
# tries left	# of SIM PIN attempts left before the SIM is blocked
Fault {code/text}	A hardware fault exists preventing normal operation. Scrollable text is displayed. Use the right button to view the scrollable text.
{quick text}	Special messages displayed for ~15 seconds or until the next button press, see Table 3 for the list of possible messages.
Pointing	In pointing mode, this message alternates with satellite bearing and elevation on a 3 second cycle
Registering	Displayed during the registration process
GPS Old	GPS is too old, obtain a fresh GPS location
Ready	Registration was successful and the unit is PS attached
Standard	Standard (best effort) PDP context is active
Stream {rate}K	Streaming PDP context is active. Streaming rate is listed: {rate} = 32/64/128
Conn Fail: {code/text}	A problem occurred during context activation. Scrollable text is displayed. Use the right (scroll) button to view the scrollable text. Press the left (user) button to clear the message. (See the Troubleshooting section for more information.) This can be caused by service subscription problems, using the wrong APN or invalid APN username/password. Check the APN and username/password on the Web UI. Failing that, contact your service provider to check the subscription.

Table 1: Status Messages

Examples:



Menu Navigation

From the status display, a short press of the Accept button takes the display to menu mode and displays the first of a circular list of menu items. The menu structure is shown in Table 2 below.

Use the scroll button to scroll between options and the accept button to select options. A short press of the Back button takes the user up one level in the menu and a long press exits the menu system and returns to the status display.

The status display is the default display, so after 30 seconds of inactivity while in the menu system the unit reverts to the status display.

Pressing the Accept button in the menu takes the display to the sub-menu for that option, or, at the lowest level, it selects the menu option, if applicable. When entering a submenu containing a list of parameter values/choices, such as connection types, the currently set choice is displayed.

Alternative parameters values can then be accessed by pressing the Scroll button; these flash until selected, and then remain on and steady to confirm they have been selected.

Note that configuration and status information shown in the menu context refers to the currently selected user TE. The user can change the selected user TE while in the menu system via the User button. This changes the displayed menu item as needed to reflect the newly-selected TE.

Level 1	Level 2	Level 3	Level 4	Comment
Connection	Standard			Starts display with the current setting
	32 Kbps			
	64 Kbps			
	128 Kbps			
	X-Stream			
	1/2 HDR			
	HDR			
	Disconnect			
Information	SMS	# New Msgs *or* No New Msgs		New message count
	GPS	{Latitude} *or* Blocked		13.32861° N format
		{Longitude} *or* Blocked		23.45833° E format
	IP Status	Global IP *or* Disconnected	{IP Address}	Shows global IP address for the selected TE
		APN	{APN string}	Displays info about the UT
		Local Gateway Address	{192.168.128.100}	
	Terminal	Version	{Software version}	
		IMEI	{IMEI}	
		IMSI	{IMSI}	
Configure	Pointing	Enabled		Starts display with the current setting
		Bypass		
	Backlight	30 seconds		Controls backlight setting. Starts display with the current setting.
		120 seconds		
		On		
		Off		
	WiFi	Enabled		Starts display with the current setting
		Disabled		
	LCD	Level 1/5		Adjusts LCD contrast immediately to displayed level. Starts with current level. Accept button confirms.
		Level 2/5		
		Level 3/5		
		Level 4/5		
		Level 5/5		
Send Text	Emergency			Sends predefined SMS with GPS fix lat/long. Displays “Sending SMS” and “SMS Sent” when complete. **You must configure the default destination for these messages from the SMS Settings web page.**
	Need Help			
	All OK			
	Need PickUp			
	Running Late			

Table 2: LCD Menu Structure

Display Icons

Battery Icon

The battery icon displays the estimated life of the battery while under battery power. The battery icon also displays the charging state while under external power.

Three segments: 75% to full

Two segments: 50% to 74%

One segment: 25% to 49%

Zero segments: 10% to 24%

Zero segments, flashing: 0% to 9%

If the icon is off, no battery has been detected.

Power Icon

The power icon displays the state of the **external power input**.

On if external power is connected.

Off if external power is disconnected.

GPS Icon

The GPS icon indicates the state of the GPS information in the terminal.

The icon **flashes** after power up until a fresh GPS fix is obtained.

The GPS icon **stops flashing** when the terminal has a new fix.

Satellite Icons

The satellite icons, located next to the GPS icon, indicate the **status of the GPS receiver** in the terminal and the **number of visible satellites**.

The icons are **off** when the **GPS receiver is off**.

The icons are **active** when the **GPS receiver is on**, either flashing or steady state. The number of icons in steady state indicates the number of GPS satellites in view. You will need all three on solid to acquire a new GPS fix. Note that once an adequate GPS fix is obtained, both the GPS receiver and all of the satellite icons are turned off.

Wireless LAN Icon

The wireless LAN icon displays the state of the WLAN feature.

No icon on LCD if **Wireless LAN** operation is **turned off**.

Visible wireless LAN icon on LCD if **Wireless LAN is on**.

Wireless LAN Lock Icon

The lock icon displays the **state of encryption** for the WLAN feature. It is **displayed only if the Wireless LAN is on and WLAN encryption is turned on**.

Globe ICON

The globe icon displays the circuit switched attach status of the terminal.

No icon on LCD if **not CS attached** to the network: no circuit switched calls possible.

Visible globe icon on LCD if **CS attached**: ready for calls.

SIM PIN entry

If the SIM PIN is enabled, the PIN must be entered before the UT can be used. This can be entered via the Web UI, LaunchPad, or the keypad.

The upper row of the LCD displays “Enter PIN” while the lower row is used for PIN entry.

The cursor flashes under the current digit location.

A short press of the Scroll button cycles the current digit 0 – 9.

A short press of the Accept button advances to the next digit. When the 4th digit is entered, pressing **Accept** enters the PIN.

A short press of the Back button moves the cursor back to the previous digit.

When PIN entry is complete, the UT confirms the correct PIN has been entered. If it is correct, it proceeds with the normal display. If it is incorrect, it displays “# tries left” on the display, where “#” is the number of attempts remaining prior to the SIM being blocked.

Multiple Users

Multiple TEs can be connected to the 9211, e.g. via the wireless LAN interface or if an external hub or switch is used. To use the menu and keypad to control connections for all the TEs, short press (< 2 seconds) the User button and the display will cycle through the IP addresses of the connected TEs.

To activate a context for a particular TE, press the user button until the correct IP address is displayed, and then press the Accept button to enter the menu and control the PDP context.

Information Messages

The following table shows possible error and status messages with explanations and suggested actions. Most of these messages will self-clear after 15 seconds, or can be cleared immediately by pressing any button on the front panel.

When setting up contexts from the menu, these messages are possible:	
MustDeact1st	There is already a context up for this TE, deactivate it before setting up a new one
Deact;TryAgn	UT is in the process of deactivating a context, try setting up the context a short time later
NotPSAttachd	UT is currently not PS attached, context setup is not possible
No TE Found	There is no TE currently connected/identified by the UT as available for data traffic
Activating	The UT is now attempting to establish the requested context; this message appears until the context is setup or an error is detected
When taking down contexts from the menu, these messages are possible:	
Deactivating	The context is being deactivated; this message appears until the context is deactivated or an error is detected
NoCntxtActiv	The TE for which context deactivation is being requested doesn't have a context setup at this time
When sending SMS messages from the menu, these are possible:	
NotCSAttachd	The UT is currently not CS attached, so it cannot send an SMS message at this time
Sending SMS	The UT is sending the requested SMS message
SMS Sent	The UT has sent the requested SMS message
SMS Failed	The UT failed to send the requested SMS message
If in pointing mode, this message is possible on the LCD:	
Insert SIM	There was no SIM detected; pointing can still continue, but once complete, "No SIM" will appear permanently and only emergency calls can be made (this message remains on for about 1 minute, then self-clears)
At any time during operation, this message is possible on the LCD:	

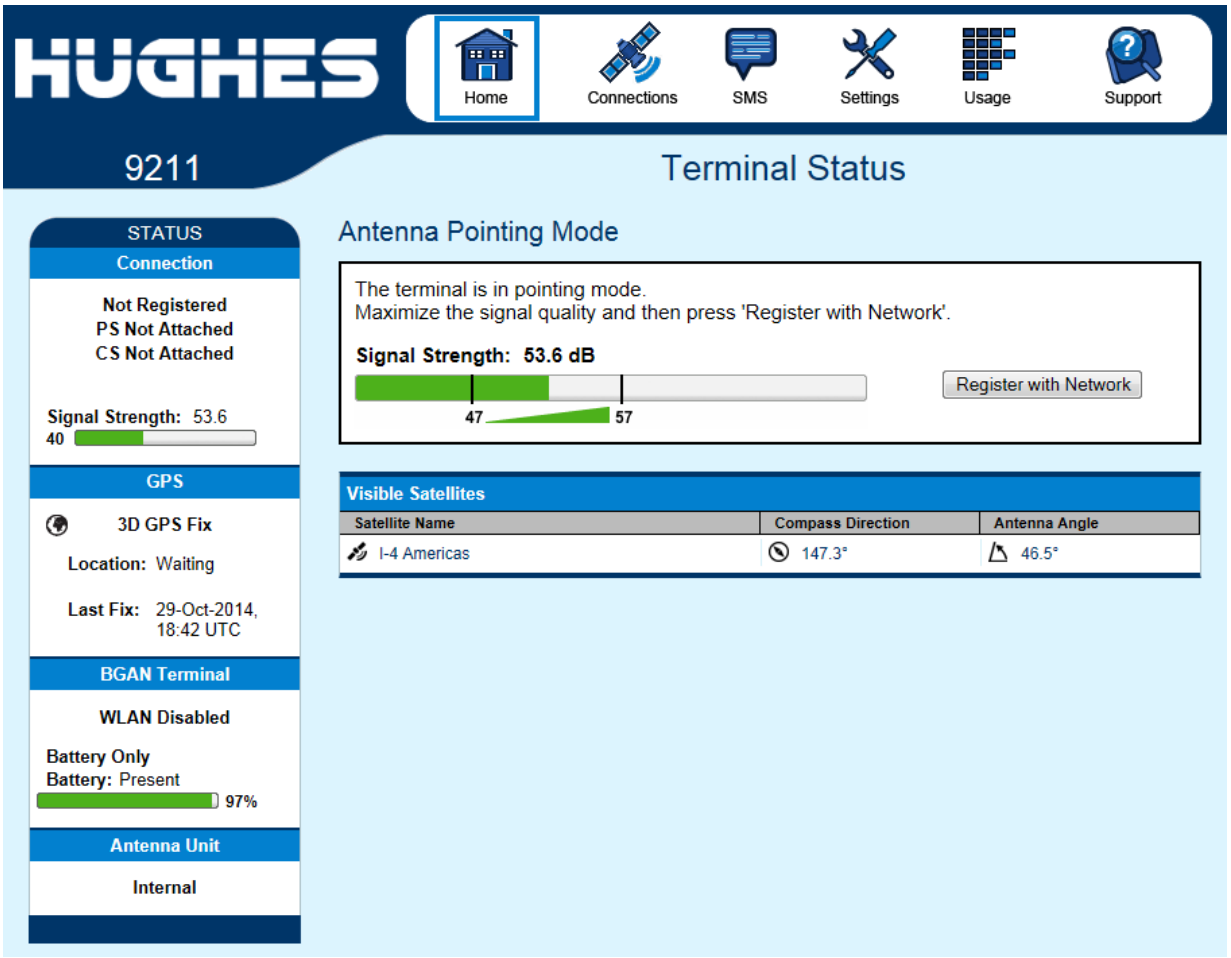
Battery Low!	The battery is extremely low. Plug in the DC cord to avoid automatic power off when the battery level becomes critical. This message persists until the condition has been corrected or a button is pressed.

Table 3: Quick-text Status Message Descriptions

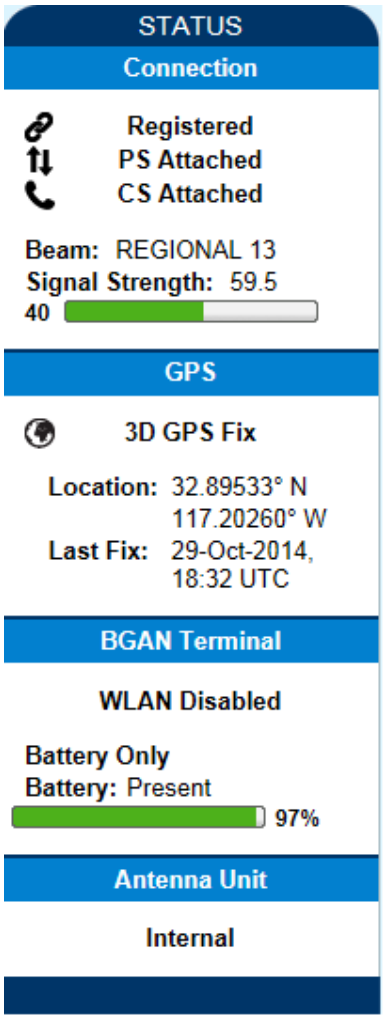
Using the Web UI

Accessing the Web UI

The Hughes 9211 UT includes its own internal Web User Interface (Web UI). To access the Web UI, open your favorite Web Browser and type in the internal IP address of the UT e.g. **http://192.168.128.100**. The Web UI opens up to the **Home** or **Terminal Status** page as shown below:



Home page



The Home page shows the current terminal status and allows you to setup your initial data connection.

On the left side of the page is the Status bar. These items are updated automatically when the status of any item changes.

1. **Connection**: This field indicates whether you are registered with the Network. It also shows the PS and CS status, beam type, and receive signal quality.
   a. **Packet Switched (PS) Attach Status**: This field indicates whether you are PS attached with the Network. Once PS attached, in most cases you will still need to setup a PDP context in order to send PS data.
   b. **Circuit Switched (CS) Attach Status**: This indicates whether you are CS attached with the Network. Once you are CS Attached and Registered with the network, you are able to make CS calls and send SMS messages.
2. **GPS**: This field displays the current GPS position status. If you have received a GPS fix and the Network GPS policy has been received and it allows the GPS position to be shown to the user, it will display the Latitude, Longitude, Fix Quality, and the Last time the GPS position was updated. Time displayed is UTC time.
   If the location is "Blocked" it means the unit has a fix but cannot yet display it because it is waiting for the GPS display policy from the network.
3. **BGAN terminal**: This field indicates the WLAN and battery status.

The sample page above shows what appears while the UT is in antenna pointing mode. Once antenna pointing is complete and you have successfully registered with the satellite network, the middle of the page updates: in the middle of the page you will find the following items:

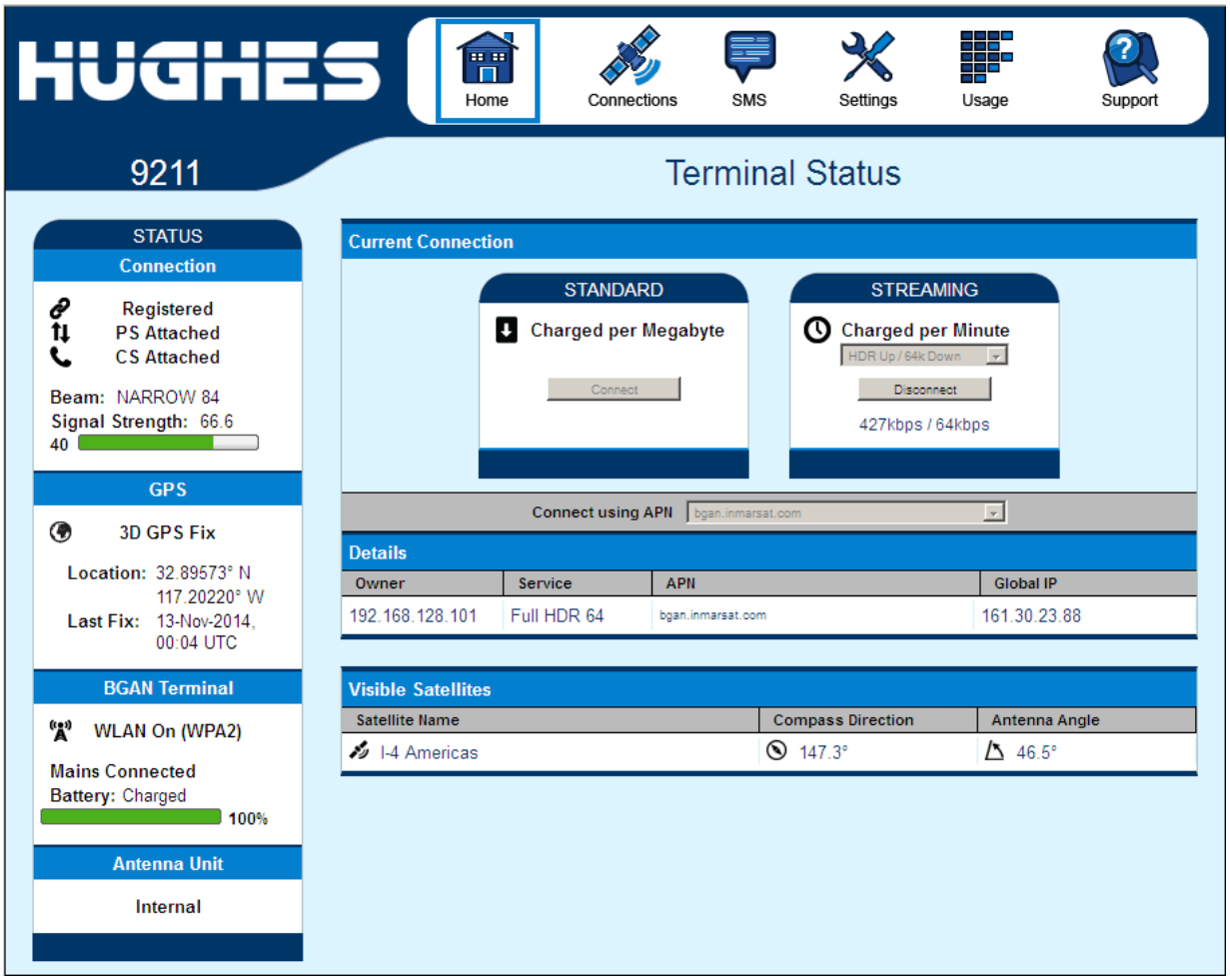
Current Connection field allows you to activate data connections for your TE. You can activate a Standard connection or a Streaming connection. For streaming connections use the drop down box to select the data rate for the stream.

Connect using APN field allows you to control the APN used for the connection.

Details show the status of the connection for this TE.

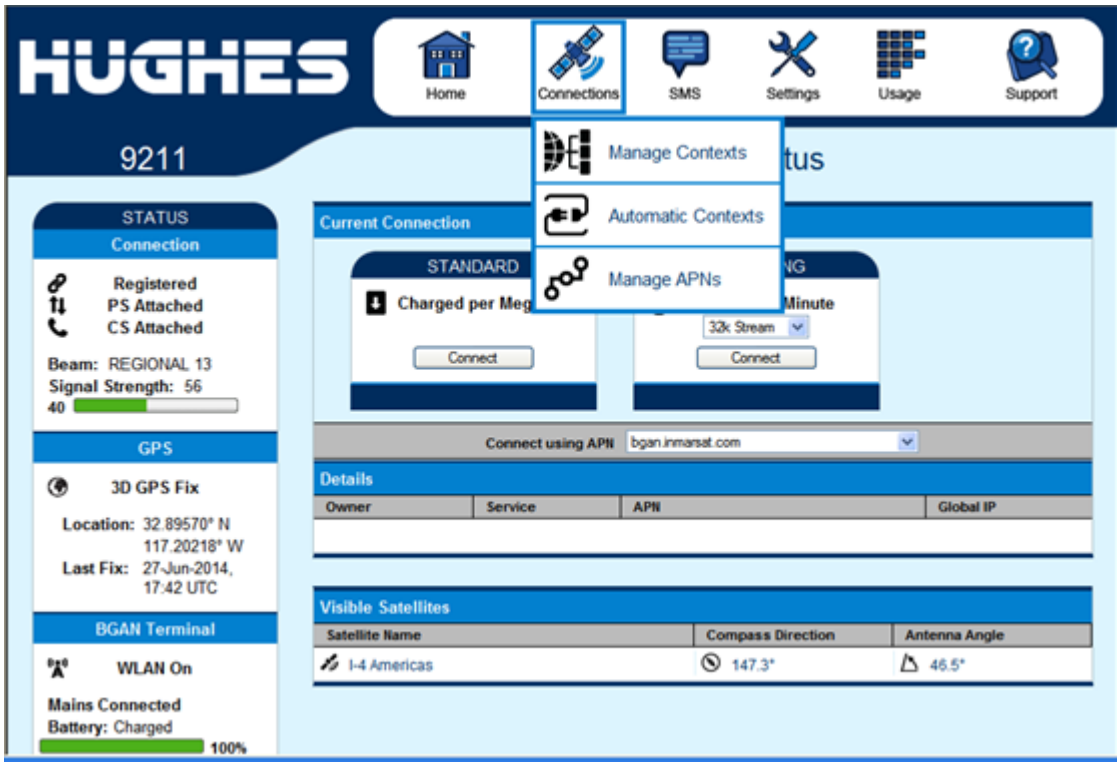
Visible Satellites shows the satellites visible from your current location and the pointing information.

The following figure shows how the UI looks before you activate a Standard or Streaming connection. After the connection is setup, use the **Disconnect** button to deactivate your connection.

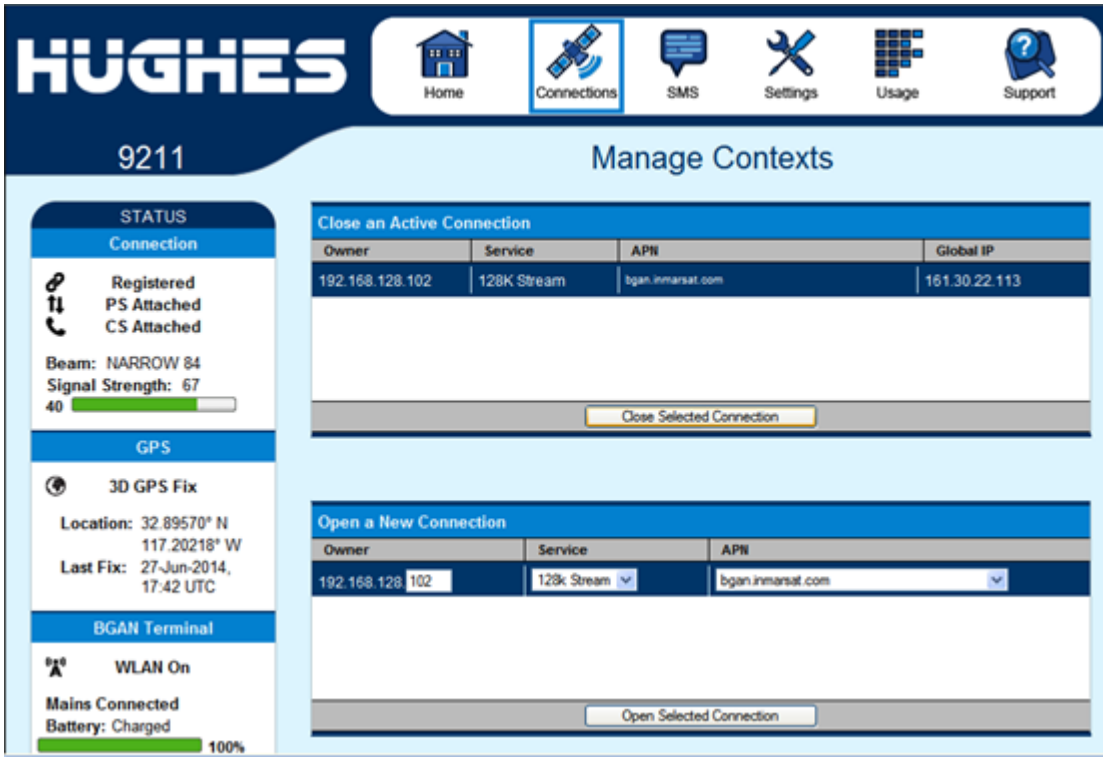


Connections

Along the top of all 9211 Web UI pages are icons representing the categories of available sub-pages. The **Connections** icon has three main configuration areas (sub-pages) to select from: **Manage Contexts**, **Automatic Contexts**, and **Manage APNs**. The following section reviews each of these pages.



Manage Contexts



The **Manage Contexts** page under the **Connections** icon allows the user to setup and configure PDP contexts (data connections) for any TE that is connected to the UT. It also shows you all current Active Connections.

Open a New Connection field - To open a new connection, select the row and enter the required data:

Owner – Your current IP address is shown by default (.101), but you can change it to control connections for any other device connected to the terminal. The page automatically displays entries for all **detected** devices and these entries can be selected to activate connections for those devices.

Service - Select the service that you want by clicking on the down arrow. The drop down list shows all of the different QoS types: Standard, Streaming 32K, Streaming 64K, Streaming 128K, X-Stream, ½ HDR and Full HDR. Select the appropriate service required.

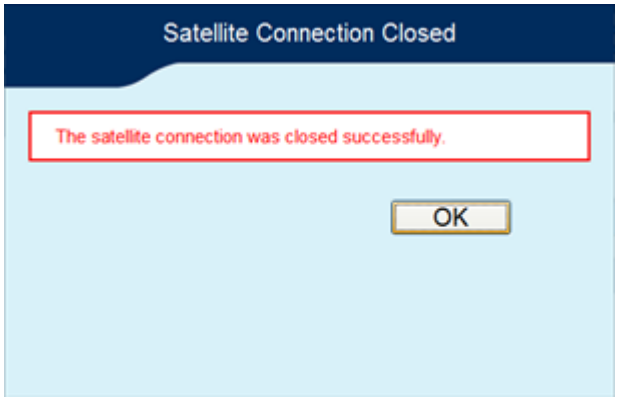
> ***Note,*** the two HDR options are asymmetric; they have a high speed uplink, but the downlink is limited to 64kbps.

APN - The APN is read from the SIM card, but if you have other APNs defined (go to the **Manage APNs** page), you can use the down arrow to select a different APN.

Username/Password: Some Service Providers require a username and password to be used when setting up a connection. This is often required when using Static Global IP addresses assigned by the Service provider. If this information is required, a "pop-up" dialog will appear once you select the APN. These fields may also be entered when defining a new APN or when you select a different APN.

Once everything is defined correctly, click on the **Open Selected Connection** button. The new context will appear in the **Close an Active Connection** field above.

Close an Active Connection field - In the upper field, all active connections are shown and you can select and close any of these connections unless an Administration Password has been enabled. See the **Security** Section for more information about the administration password.



Automatic Contexts

This web page allows you to use Automatic Context Activation (ACA) in **two** different ways;

- One way is to use a static IP addresses in the TE device so you can establish an automatic PDP context with any QoS that is offered by the network (upper half of the web page).
- The second way is to use DHCP IP addresses so you can establish an automatic standard PDP context for any TE that connects via DHCP to the UT (lower part of the web page).
- There are also two ways to set the ACA whether you choose Static or DHCP. You can choose whether the context should be activated as soon as the UT detects the device ("ON"), or if the context should only be activated when the TE attempts to send data to the satellite link ("Data"):
    - "Always ON": Select ON in the drop down menu if you want the context to be On all the time.
    - "Data": Select Data if you want the context to be activated when the TE attempts to send data to the satellite link

NOTICE

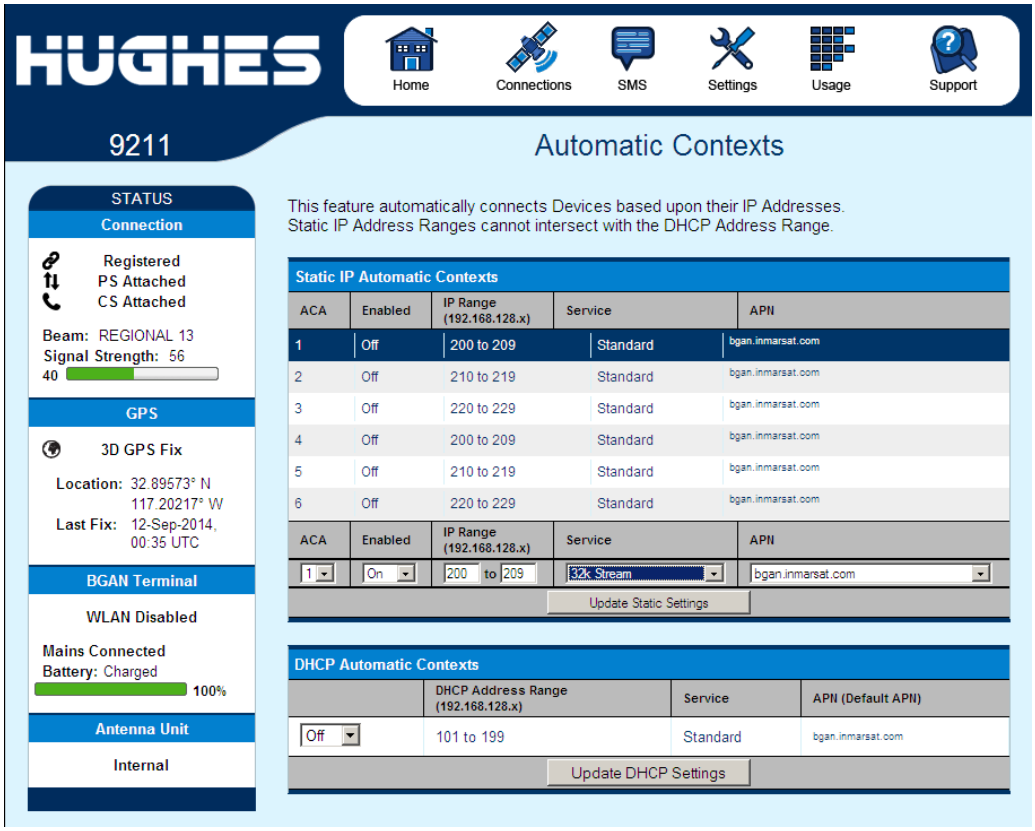
When using "Data" ACA, if the context is ever deactivated, it will be reactivated when more data is sent.

The "On" option will always reactivate the context if it is deactivated, even if data is not sent by the TE.

Static IP Automatic Contexts: You can configure your own range of static IP addresses and QoS's to use with a static automatic context.

To turn on a particular range of static addresses, select "On" or "Data" from the drop down list and choose a range of addresses, low and high to use (e.g. 192.168.128.200 to 192.168.128.202) or you can leave the defaults (192.168.128.200 to 192.168.128.209).

Next, select the desired QoS for that range of IP addresses (e.g. ***Standard***). The APN listed is the default APN read from the SIM card (bgan.inmarsat.com). If your SIM is provisioned for more than one APN, then you can select a secondary APN from the drop down list.



If you want to setup additional ranges of addresses, please follow the same instructions as above.

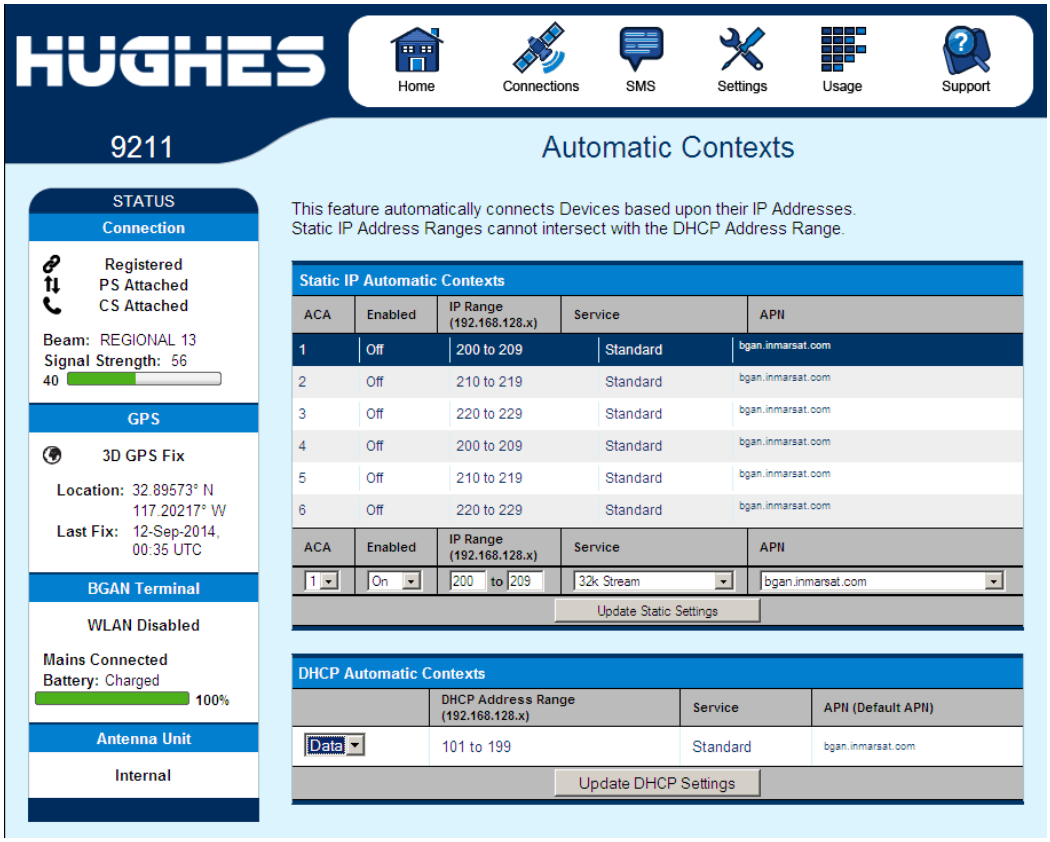
NOTICE

You cannot overlap the IP address ranges. If you do, an error message will pop-up telling you that you have an overlap region. Check all of the ranges for overlaps and try again.

When you are finished, click on **Update Static Settings** and you should see a message saying "Operation Successful".

DHCP Automatic Contexts: This option allows you to set up the UT for dynamic ***standard*** ACA. This means that any device connected to the UT via ***DHCP***, whether wired or wirelessly, will automatically receive a standard context. **Note: Streaming contexts are not supported with DHCP ACA**. For Streaming contexts, you must use Static ACA, described above.

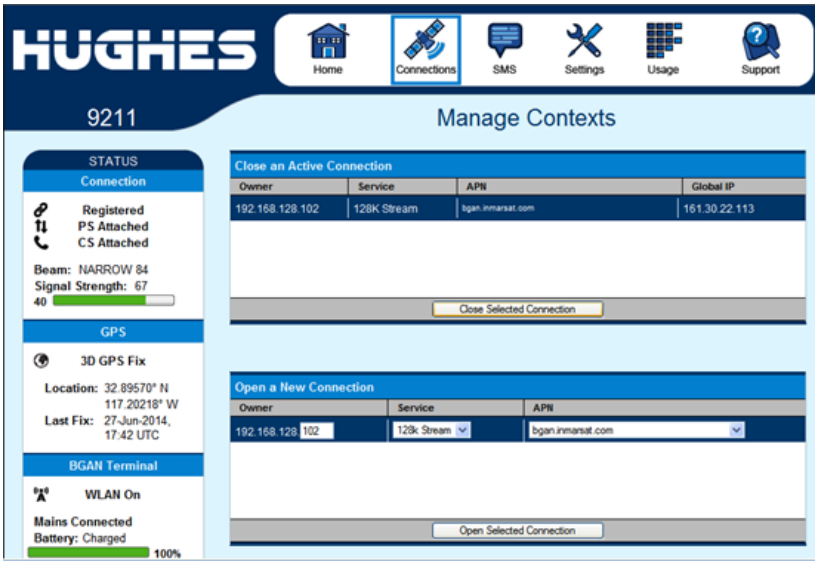
To activate this feature, select "On" or "Data" from the drop down list under the **DHCP Automatic Contexts** section. The DHCP address range is configured on the IP Address/DHCP Settings page. The APN will be the default APN configured on the **Manage APNs** page.



Once you hit "Update Static Settings" you will get a pop-up message saying that the ACA settings were updated successfully and to take effect you will have to reboot the terminal.

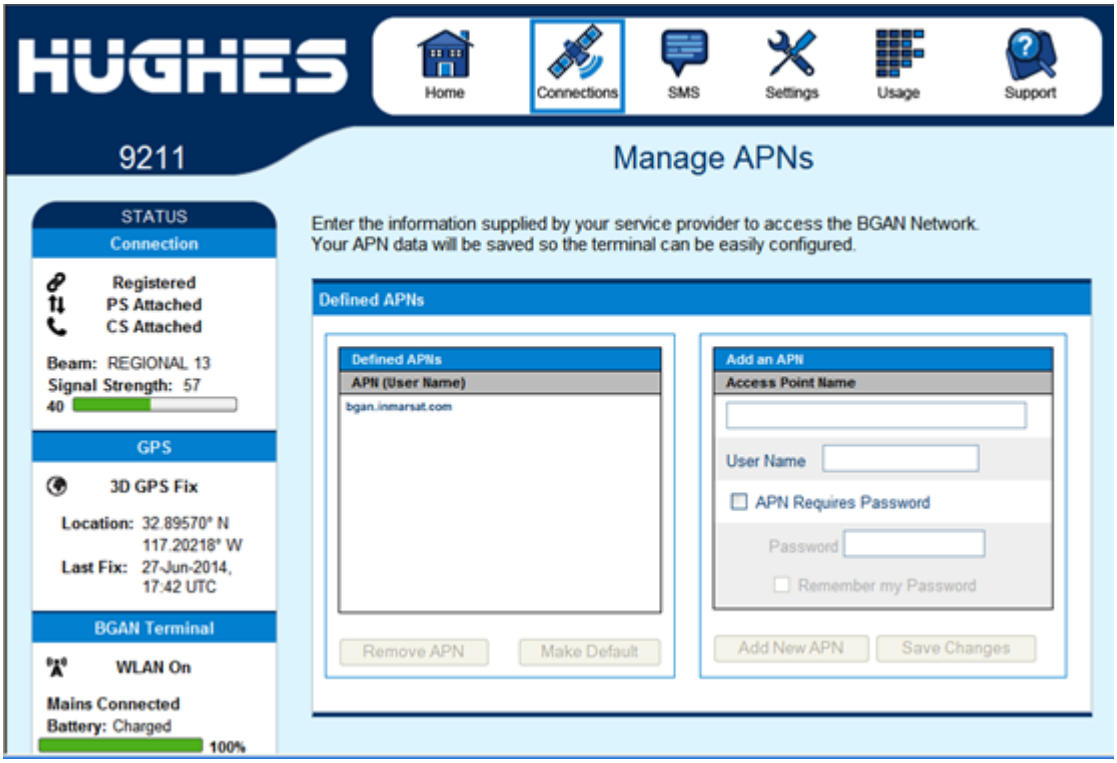
Once you reboot the terminal, check that the settings took effect.

To see if the context has been setup properly, click on the **Connections** tab>**Manage Connections** Page and this will show you all contexts that have been setup (active or inactive).



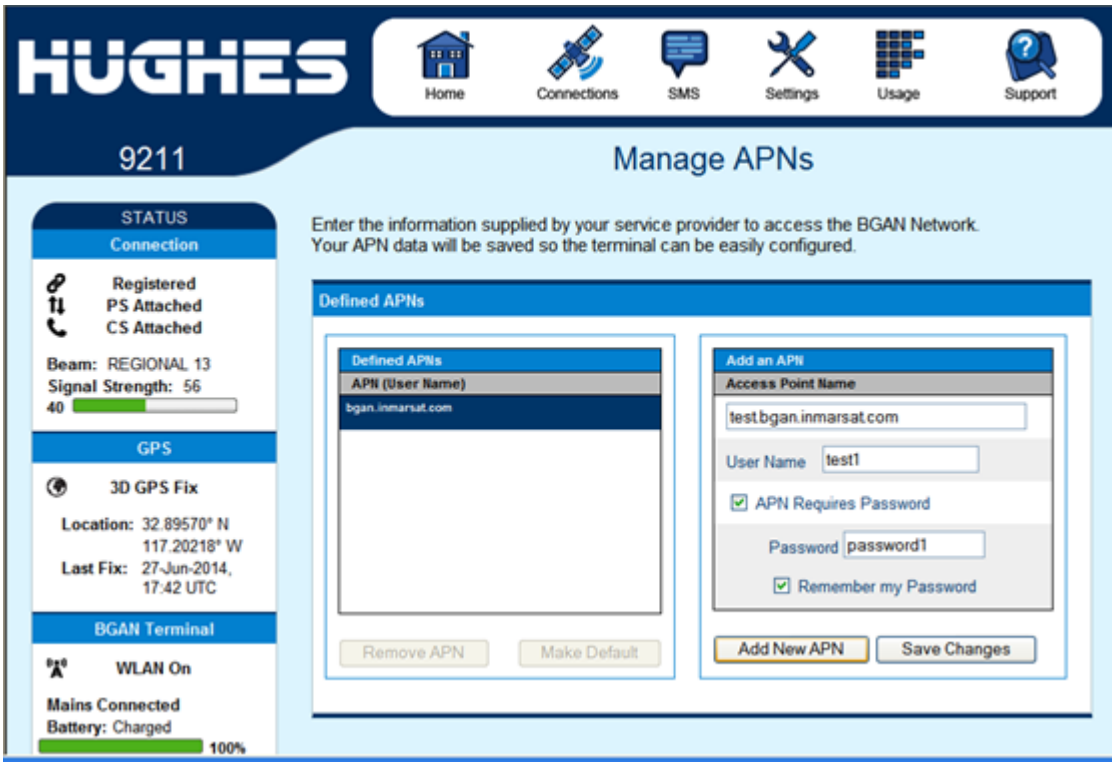
Manage APNs

Some SIM cards are provisioned with multiple APNs, so you can use this page to pre-configure those additional APNs if needed. Once the APN is defined, you can select it from the drop down list without having to put in the username and password every time.



Add an APN field – Use this field to add an additional APN that you want to use, or to edit an existing APN. For adding a new APN, type in the new APN and username (if required) then select **Add New APN**. If the APN requires a password, select the "APN Requires Password" box. If you want to save the password so you don't have to re-type it each time you configure a PDP context for that APN, check the "Remember my Password" box and then click the **Add New APN** button. (The username is always saved if entered.) The new APN name will show up in the **Defined APNs** field with the username in parentheses. This APN will now be available to use from any APN drop down menu.

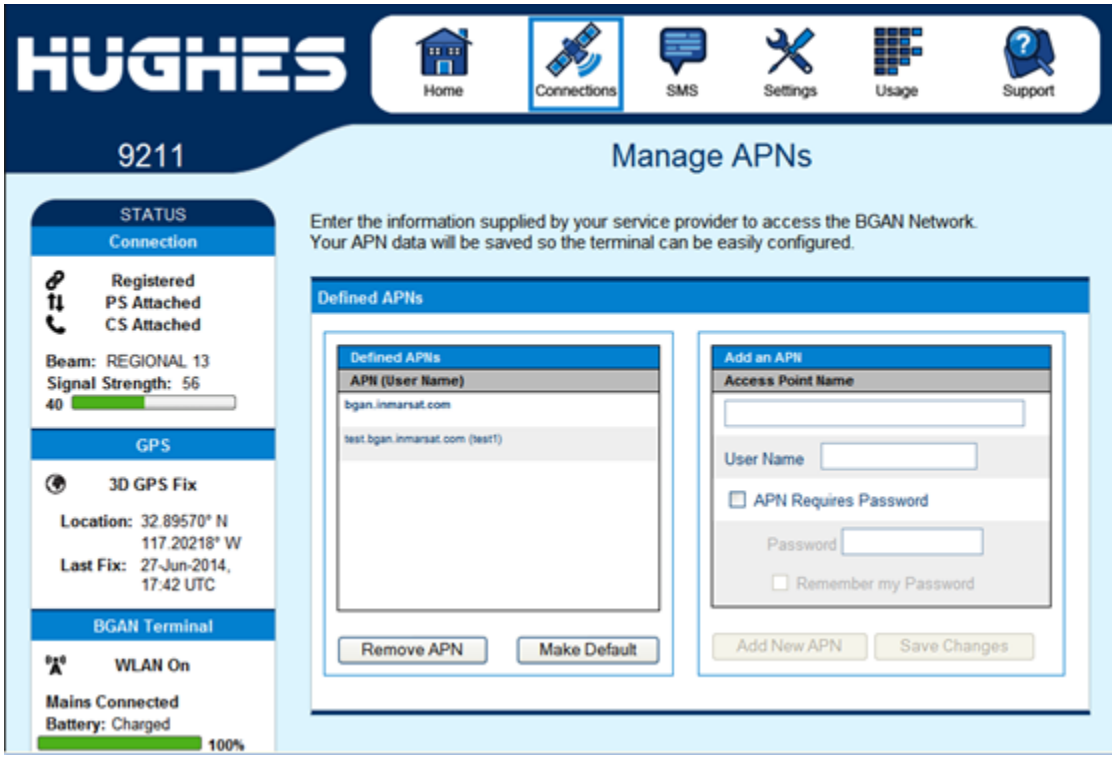
User Name /Password: Some Service Providers require a username and/or password to be used when setting up a connection. This is often required when using Static Global IP addresses assigned by the Service provider.

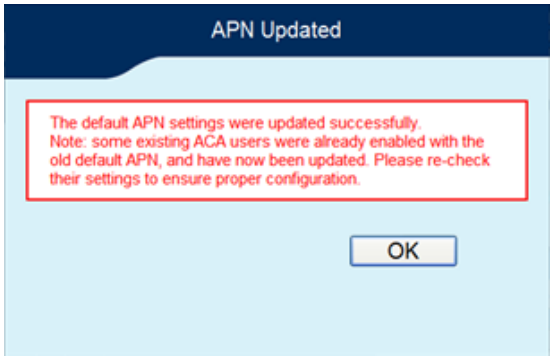


The screenshot above shows the new APN that was added, in the **Defined APNs** section.

If you wish to edit an existing APN, first select the APN to edit under the **Defined APNs** section on the left. The information for that APN will then appear in the **Add an APN** field to the right, and you can then edit it. Click the **Save Changes** button to save your changes.

Make Default. If you wish to change the default APN, select an entry in the list of Defined APNs and then click **Make Default**. This APN will now be the default APN on the other context control pages. **Note:** The pop-up message below warns you that APN's have been updated and changed and to re-check your settings.



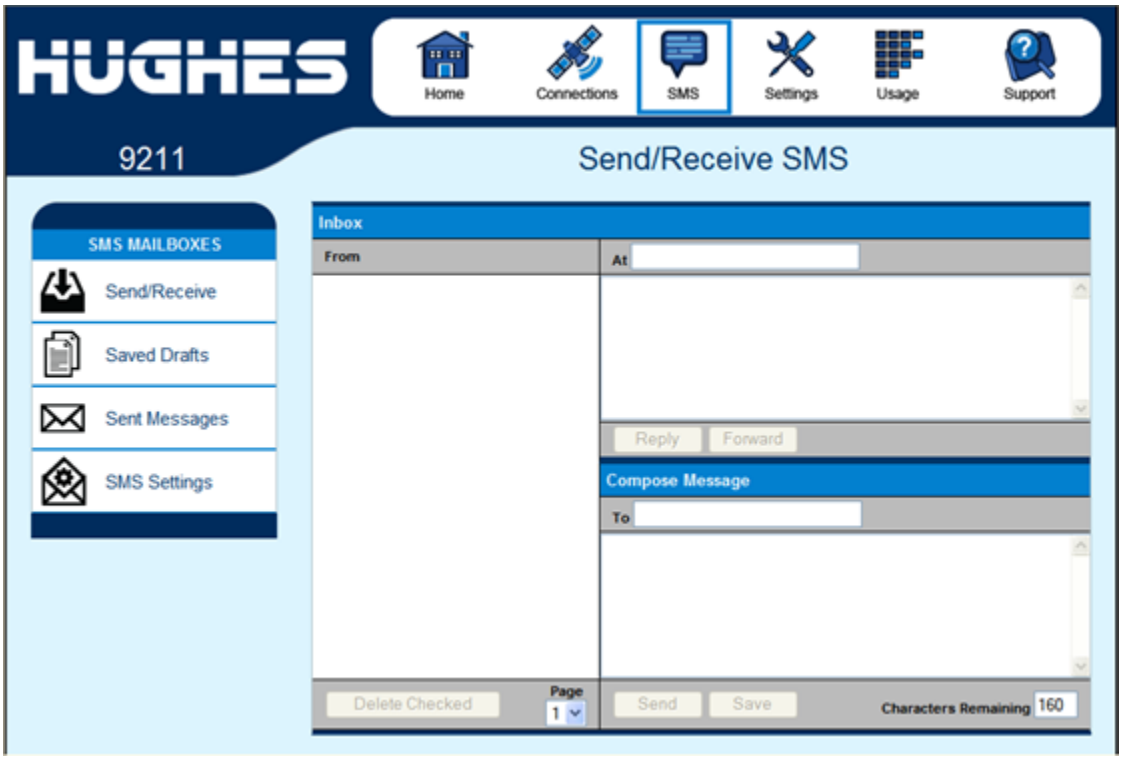

APN Updated
The default APN settings were updated successfully.
Note: some existing ACA users were already enabled with the old default APN, and have now been updated. Please re-check their settings to ensure proper configuration.
OK

SMS

You can manage SMS text messages from the **SMS** pages. You must have a valid Service Center number configured in order to send SMS messages – see the **SMS Settings** Page.

Send/Receive

The **Send/Receive** page allows you to view your Inbox messages and Compose a new message. If there are more than 10 messages, you can view the older ones by changing the page number. You can also reply to received messages or forward them to another number.



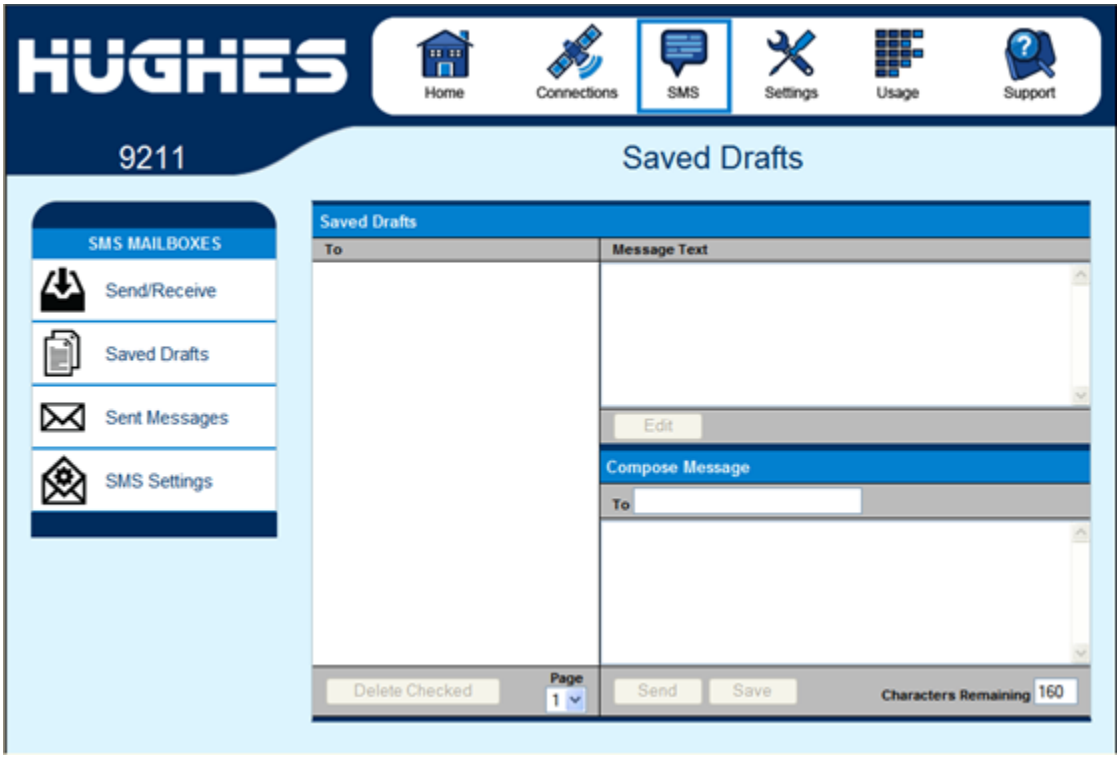
You may need to periodically delete messages to prevent the SIM from filling up, which will prevent the receipt of new messages. Select a single message by checking the box next to it and press the **Delete Checked** button. To delete multiple messages just select the check box next to each message.

After composing a message you can save it to drafts rather than sending it, by pressing the **Save** button.

Saved Drafts

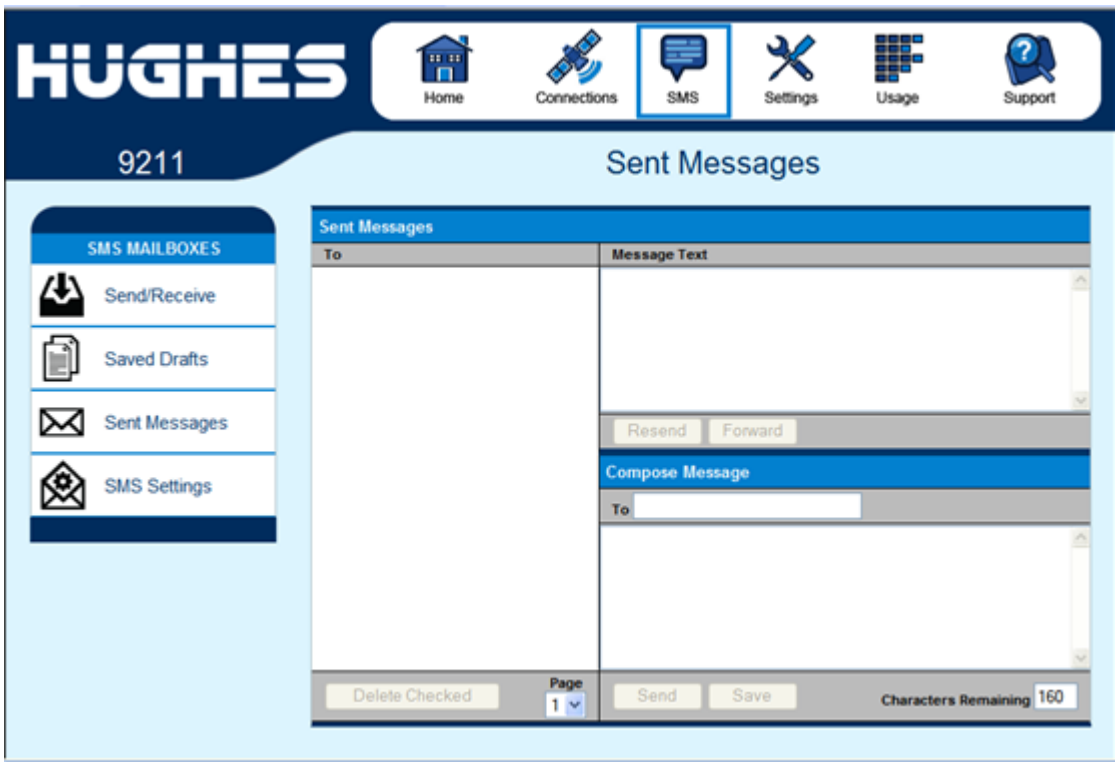
The **Saved Drafts** page allows you to view previously saved messages. After editing a message you can resave (Save) or send

the message (Send). You can also compose a message from this page.



Sent Messages

The **Sent Messages** page allows you to view previously sent messages. Again, you may need to periodically delete messages to prevent the SIM from filling up. You can also compose a new message from this page.

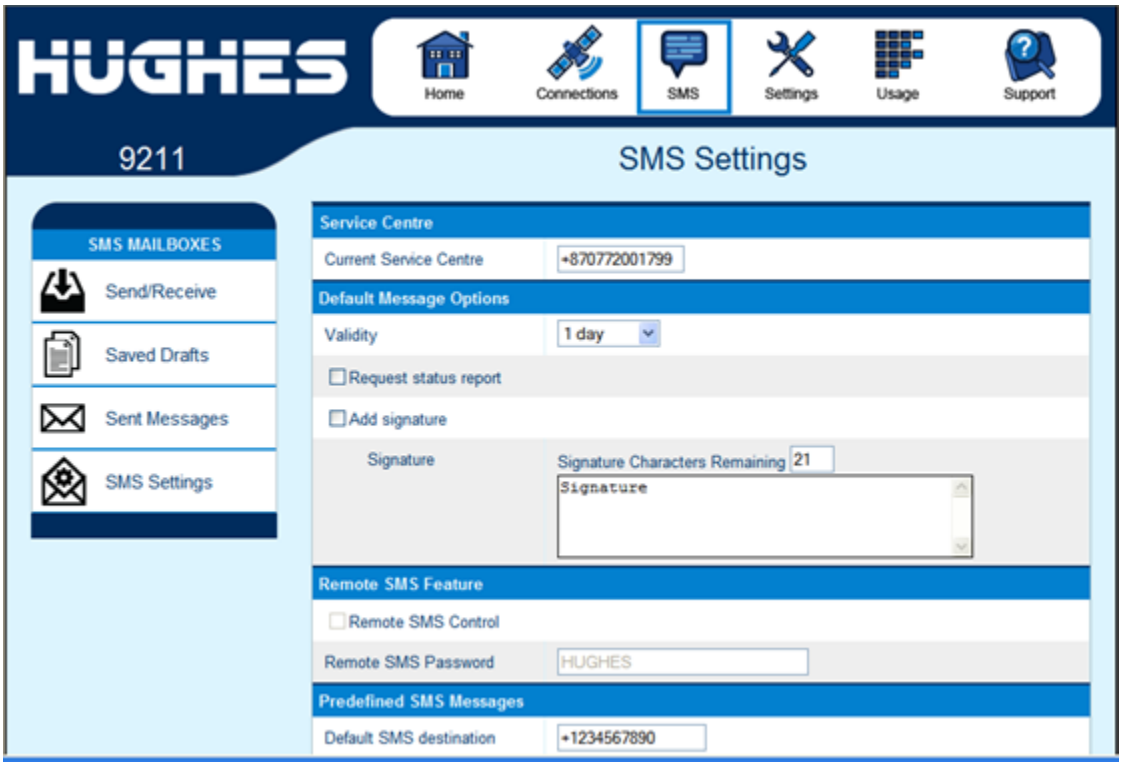


SMS Settings

On the **SMS Settings** page you can configure the default settings for messages.

NOTICE

You must have a valid Service Center number configured in order to send messages. The default Service Center number is +870772001799.



In the **Remote SMS Feature** section you can enable the unit to receive and act on special remote control SMS messages. Contact your service provider for more information on this feature. Before this feature can be enabled you must obtain the feature activation code from your service provider and activate the feature from the Features Web page.

You can configure the password that must be contained in remote control SMS messages. Be sure to make a note of the password if you change it from the default. Note: If you activate this feature and do not change the password, it is possible that other people may be able to send control messages to your unit.

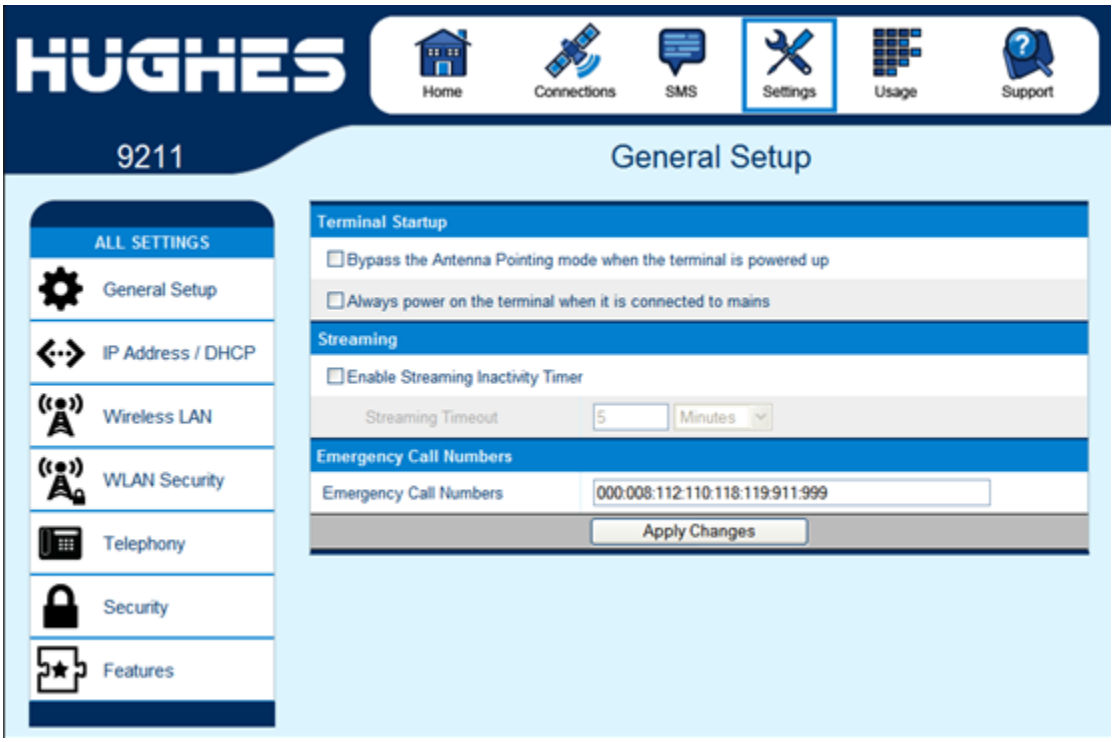
Remote control messages will be deleted after they are received and will not be stored in the SIM. The **Default SMS destination** is the SMS address that is used when sending any of the pre-defined text messages from the keypad. (See Menu Navigation on page 21).

Settings page

General Setup

This page allows the user to configure various parameters of the UT. A description of each item follows:

Terminal Startup – by default Bypass Antenna pointing is not selected but if the terminal is permanently mounted you can select this option to bypass antenna pointing on subsequent power ups. For permanent installs you can also configure the unit to always power on when mains is connected to avoid having to use the power button.

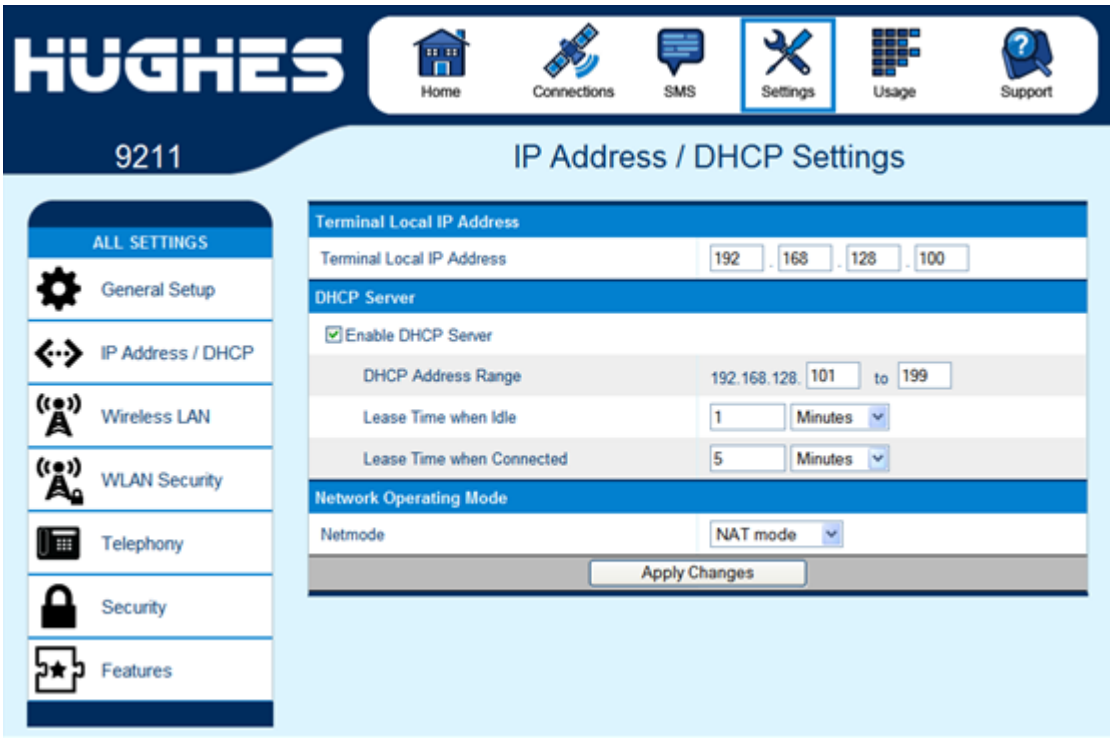


Streaming – By enabling this parameter, the user can turn on a timer for inactivity on streaming connections. The timer is in either seconds or minutes and will tear down a streaming context after **X** seconds or minutes of inactivity.

Emergency Call Numbers: Allows the user to add the emergency call number that is applicable in the part of the world where the terminal is being used, if it is not already defined.

IP Address/DHCP Settings

Terminal Local IP Address: This section allows the user to change the local IP address of the terminal from the default 192.168.128.100 IP address. All four octets are available to change. Once the local IP address is changed on this page and applied, the IP address ranges for the DHCP server, the Manage Context page and ACA page will also be changed automatically.



NOTICE

Updates to the IP address will **not** take effect until the UT is **rebooted.**

DHCP Server: allows the DHCP server in the UT to be turned on or off by checking the Enable box.

DHCP Address Range: This allows the user to set the range of DHCP addresses that are given out by the UT to connected TEs.

Lease Time when idle: Idle-mode DHCP Lease Time refers to the DHCP lease time when the UT is not connected to the network. This parameter allows the user to change the default time (60 seconds) that the DHCP lease to the TE is good for. This parameter was introduced because problems with some devices that will not accept a short DHCP lease time.

NOTICE

The longer the Idle-mode DHCP lease time, the longer it will take the Network/UT to update the TE with the correct DNS servers for web browsing after establishing a data context.

Lease Time when connected: The Connected-mode DHCP Lease Time refers to the DHCP lease time when the UT is connected to the network. Most users will have no need to change this parameter.

Network Operating Mode: The Netmode field indicates the mode of operation of the terminal. In NAT mode the UT will translate between the local and global IP addresses. In Relay mode the UT will supply the global IP address to the TE once a PDP Context is established. Relay mode is single user/single PDP Context and only supports a single connected TE. **Note:** Updates to this field will not take effect until the UT is restarted.

Nat Mode

In **NAT mode** once a PDP context is active, the UT will translate between the local and global IP addresses. This is a basic NAT that only performs IP address translation. It does not use port translation.

Relay Mode

In **Relay mode** the UT will supply the global IP address to the TE when the context is established. Relay mode is single user and only supports a single connected TE.

In Relay mode DHCP is required to provide the global IP address to the TE. When the context is activated, the DHCP server in the UT will NACK the next DHCP lease renewal from the TE and assign the global IP address assigned by the network. The local IP connection will be torn down and reestablished as the IP address changes. Similarly, when the context is deactivated the DHCP server will NACK the lease renewal and then reassign the original private IP address.

LaunchPad and the Web UI will lose and reestablish their connections to the terminal as the IP address is changed.

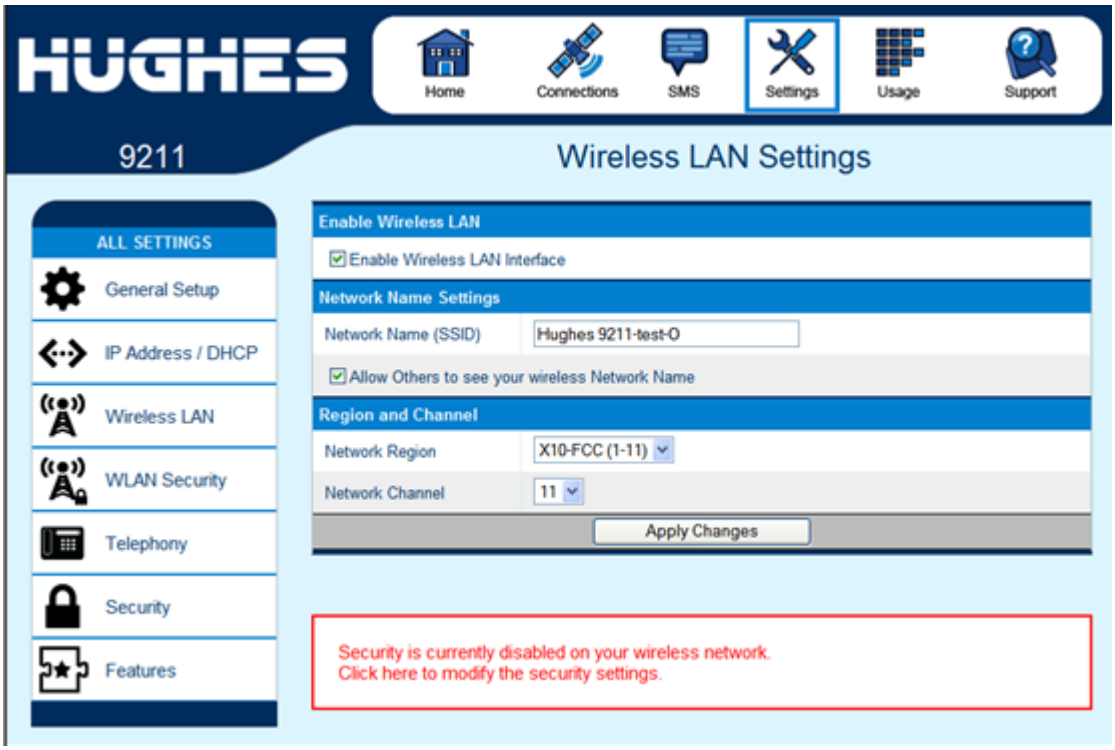
To make the IP address change happen quickly a short DHCP lease should be used. The terminal defaults the DHCP lease time to 60 seconds in idle and connected mode.

NOTICE

Relay mode only supports a single user TE.

Wireless LAN

The Wireless LAN settings page allows the user to enable, disable, and configure the Wireless LAN functionality of the terminal.



NOTICE

The Wireless LAN Security is controlled on a separate web page – WLAN Security.

If you have not previously used the terminal's WLAN interface, it has to first be enabled from this page using a computer connected to the terminal using an Ethernet connection. Once WLAN is enabled and configured, TEs can connect to the terminal wirelessly.

Fields on this page include:

Enable Wireless LAN Interface: Turns the Wireless LAN interface on/off. The default is off (unchecked).

Network Name (SSID): The default is "Hughes 9211", but you can change it to whatever you want.

NOTICE

You can "hide"/prevent the SSID broadcast on the WLAN Security page

Network Region: There is only one region for all countries.

Network Channel: This controls the radio channel number (1 through 11) used by the access point. To meet FCC regulations, channels 12 to 14 are not supported.

NOTICE

If performance issues occur over the WLAN interface, changing the Channel may help.

Wireless LAN Security

This page allows the user to configure WEP, WPA or WPA2 Security for use when the terminal is communicating wirelessly to TEs. Additional security measures that can be used with encryption to make it more secure are:
1) Do not broadcast your SSID and
2) Enable MAC address filtering so that only the MAC addresses that you select, can connect to the terminal. A maximum of ten (10) addresses can be filtered.

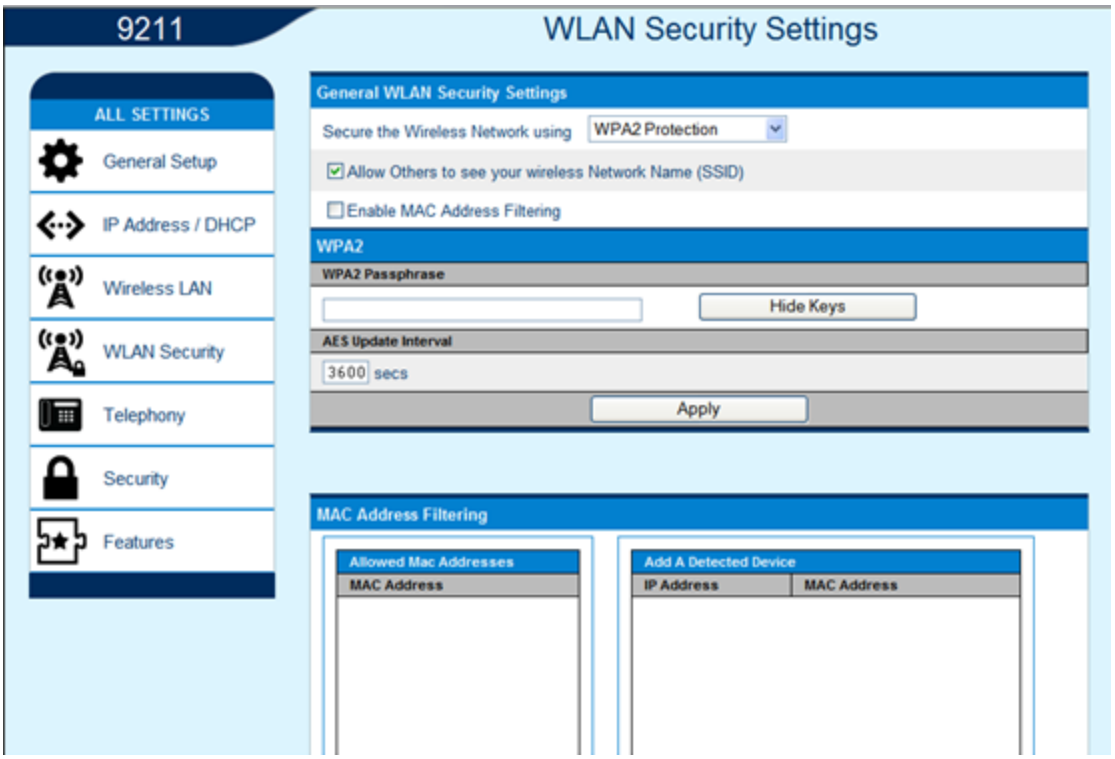
Check the box if you want your SSID name to be broadcast.

Select from the down arrow, No protection, 64 bit WEP, 128 bit WEP, WPA or WPA2.

For 64 bit WEP, define a 10 hex character key.
For 128 bit WEP, define a 26 hex character key.
For WPA and WPA2, define an 8 to 63 character passphrase.

Mac Address Filtering

Check the box to *Enable MAC Address Filtering*
If any TE is already connected to the terminal wirelessly, the MAC address of that TE will be detected and show up in the **Add a Detected Device** field.



To add the detected MAC address, click on the address to highlight it and then click Add. It will now show up in the **Allowed MAC Address** field.

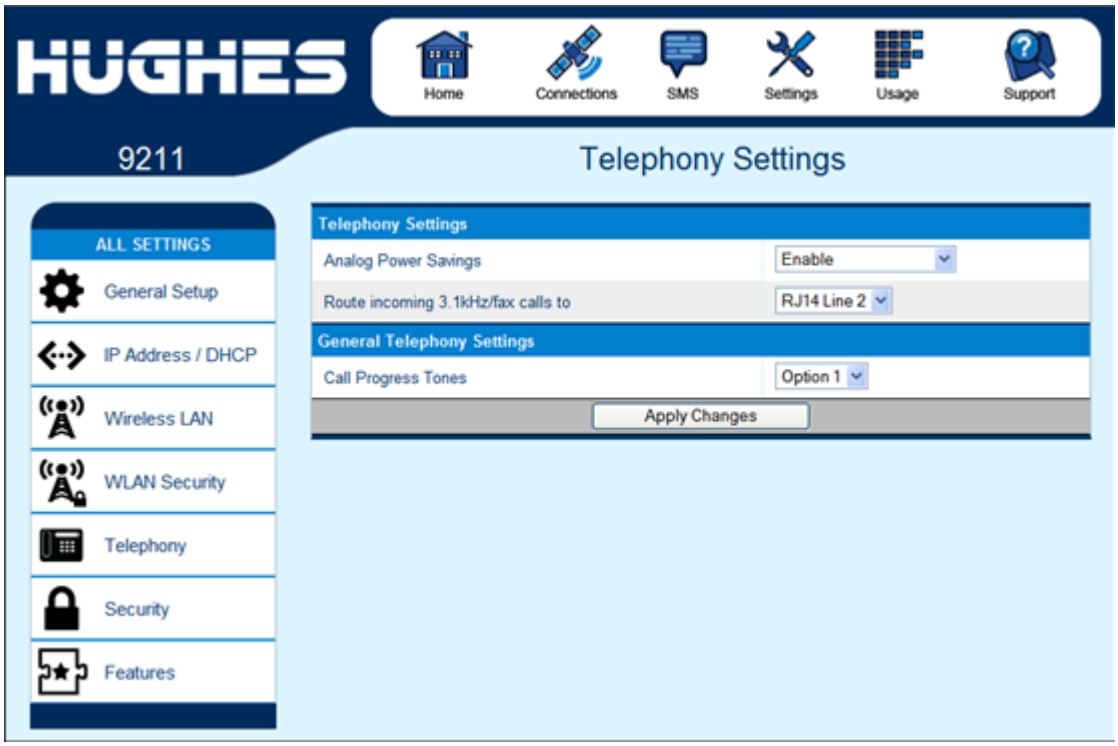
Telephony

Telephony Settings:

Analog Power Savings: This field turns off the 48V POTS supply voltage between calls in order to save power. If you do not get a dial tone a few seconds after you take your analog handset off hook, try changing this field to "Disable (Always on)". The 48V will always be On so the terminal will work with a wider range of handsets, but the operating time on battery will be reduced.

Route incoming 3.1kHz/fax calls to: By default, incoming 3.1kHz/fax calls are routed to the second RJ11 port on the RJ14 connector. However, if you have a device that supports both voice and 3.1kHz/fax on a single line, you can configure the RJ14 port to support both services on line 1. Set this field to "RJ14 port 1" and simply connect the device directly to the RJ14 port with an RJ11 cable. With this setting in Analog telephony mode, all incoming calls are then routed to RJ14 line 1. To initiate a 3.1kHz/fax call when connected to line 1 add a 2* prefix in front of the dialed number (note: this works regardless of the setting on the Web page). For voice calls, no prefix is required, but the 9211 will accept a 1* prefix to indicate a voice call.

To receive incoming calls on line 1, change the Route incoming 3.1KHz/fax calls parameter on the Telephony Settings page to "RJ14 Line 1" using the drop down menu.



General Telephony Settings:

Call Progress Tones: Two options are provided for call progress tones. Option 1 is the default tones used in the USA. Option 2 provides an alternative set of tones that are used in Brazil and some European countries.

With Option 2 the ringing voltage changes to 36V rms on 48V DC rather than just 48V rms AC.

Call Progress Tone	Option 1 (US)		Option 2 (Alternative)	
	Freq (Hz)	Cadence	Freq (Hz)	Cadence
Dial	350 + 440	Steady ON	425	Steady On
Ring Back	440 + 480	2 sec ON 4 sec OFF Repeating	425	1 sec ON 4 sec OFF Repeating
Network Congestion	480 + 620	0.25 sec ON 0.25 sec OFF Repeating	425	0.5 sec ON 0.5 sec OFF Repeating
Busy	480 + 620	0.5 sec ON 0.5 sec OFF Repeating	425	0.25 sec On 0.25 sec OFF Repeating

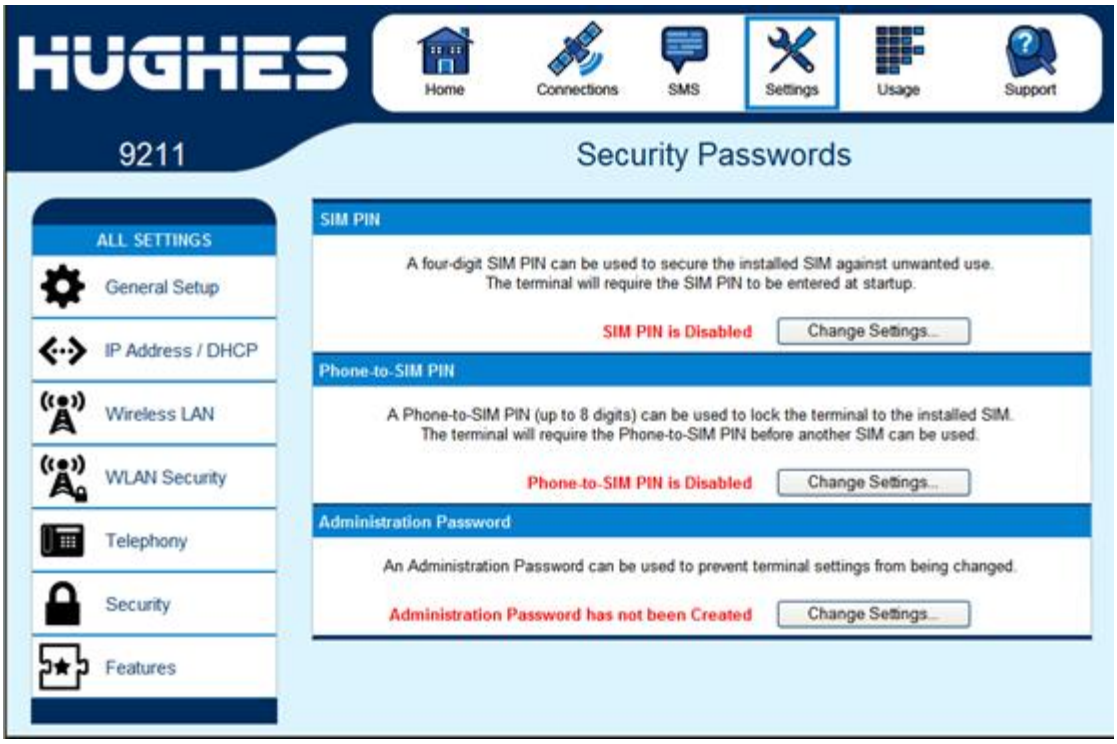
Security

You can configure three separate security settings on this page: 1) SIM PIN, 2) Phone to SIM PIN, and 3) Administration Password.

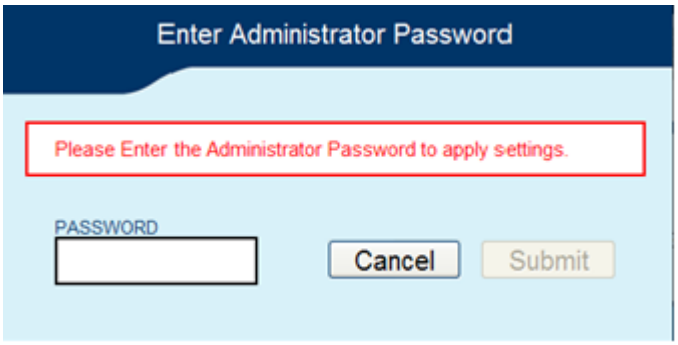
SIM PIN – this is a four digit field that can be Enabled and configured by the user to secure the terminal against unwanted use. Once enabled, the terminal will require the SIM PIN at startup.

Phone to SIM PIN – use up to 5 digits to lock the terminal to the current SIM card. The Phone to SIM PIN code will have to be entered any time the SIM card is changed. This setting is similar to your GSM phone's security code. Default password is 12345.

Administration Password – this configuration allows the user to prevent terminal settings from being changed once the terminal is configured properly. This password will have to be entered before any settings can be changed. See screenshots below.

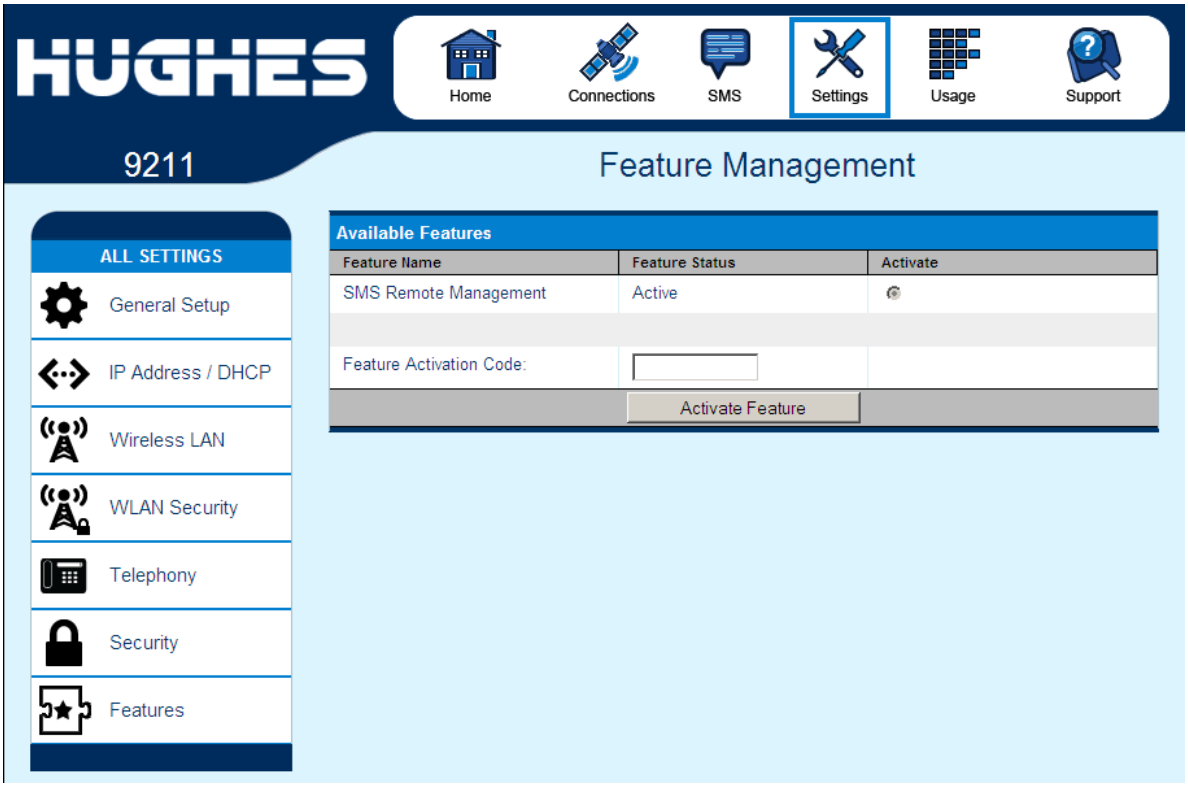


The Enter Administrator Password pop down screen appears the first time the user tries to edit a parameter if the Administrator password is enabled.



Features

You can enable special features from this page if there are any available.



SMS Remote Management is "Active" by default and allows the unit to receive and act on special remote control SMS messages. It is fully compatible with Remote terminal Manager (RTM) and supports over-air upgrades.

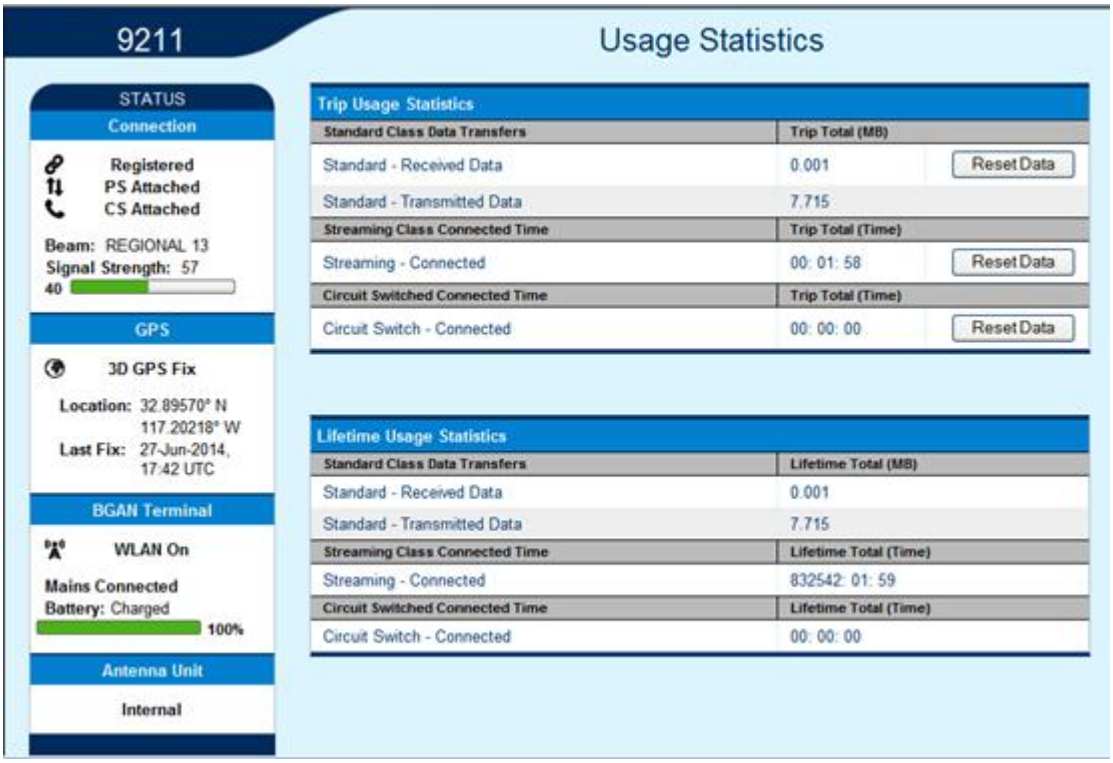
To use the feature you must enable it on the **Remote Settings** SMS page.

Usage Page

This web page provides an estimate of the amount of Packet Switched data that was sent and received, along with time spent on streaming connections and CS calls. The data is broken up into two types:

Trip Usage Statistics: The trip counter is similar to the trip counter on your vehicle. It can be zeroed out at any time by the user and it will track the statistics until the user resets it.

Lifetime Usage Statistics: The Lifetime counter is similar to the odometer on your vehicle. It shows the statistics of the terminal since the software version that added this feature was loaded onto the UT. The user **cannot** reset these counters.

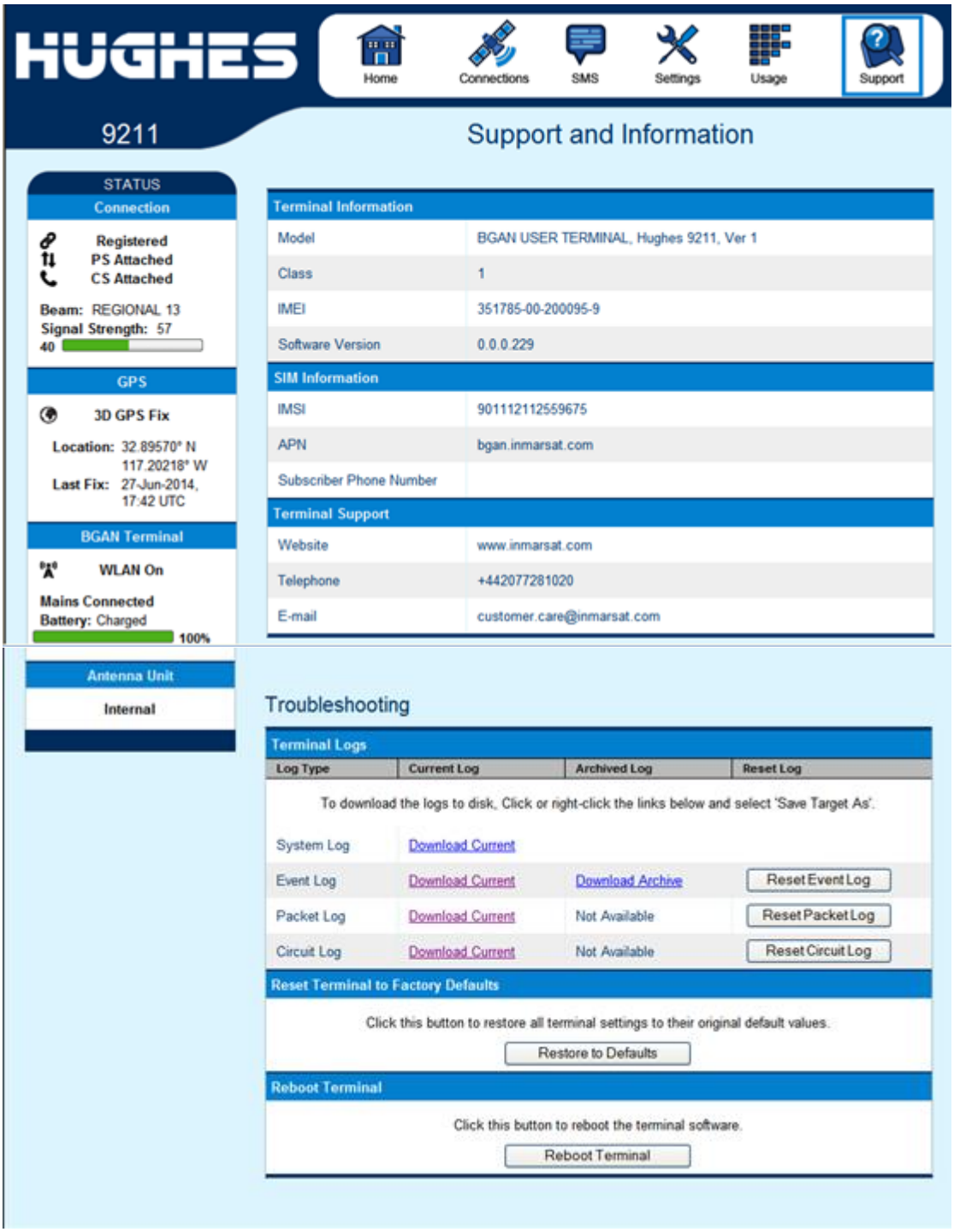


NOTICE

If the UT power is abruptly disconnected for some reason, the UT will not be able to save the statistics to flash and hence the statistics for the session (**Trip**) may be inaccurate.

Support Page

This web page allows you to display technical and support information about the terminal and retrieve logs.



Support and Information

Terminal Information

Model: this displays the UT model number.

Class: this indicates the UT Class.

IMEI: This displays the IMEI (serial) number of the UT.

Software Version: This displays the current version of software that is running on the UT.

SIM Information

IMSI: This displays the IMSI number of the SIM card in the UT. If is the IMSI is not displayed, it indicates that there is a problem reading the SIM card, e.g. because there is no SIM, it is installed incorrectly or PIN must be entered.

APN: This is the APN read from the SIM card.

Subscriber Phone Number: this field displays the MSISDN or phone number for the terminal's voice service. The number is only displayed if the number was configured in the SIM by your service provider. Even if no number is shown, the service may still be active because this field is just for your information and is not required for the service to operate.

Terminal Support – contact information retrieved from the SIM card.

Website
Telephone
E-Mail

Troubleshooting

Terminal Log Files: This allows you to extract and save any of the following log files for troubleshooting purposes:

System Log
Event Log
Packet Log
Circuit Log

These files can be e-mailed to Hughes directly for fault analysis if the user experiences any problems.

This uses FTP to retrieve the files from the UT which can be blocked by some security software such as McAfee. If you encounter problems, check your PC security settings.

Reset Terminal to Factory Defaults: Clicking the "Restore to Defaults" button will restore the UT back to the factory default settings and delete any of the user parameters that have been set-up in the UT.

NOTICE

Hughes highly recommends that the user exhaust all possible troubleshooting procedures before using this feature

Reboot terminal: Clicking this button reboots the terminal so that configuration changes can be saved into the configuration file or it can be used when just a simple reboot of the terminal is required.

Troubleshooting

Problem	Possible Cause	Possible Solution
Terminal will not turn on	Battery not connected properly Battery not charged	Check battery is correctly installed Connect AC/DC converter to charge the battery
Cannot get SIM card to lock into position	SIM is not correctly oriented for insertion	Ensure the SIM is pressed firmly into the SIM slot Ensure the SIM is oriented as shown in the Setup section
The BGAN LaunchPad or web UI will not connect to the terminal	No interface connection between the terminal and computer Your computer is configured with a static IP address in the wrong subnet. Default UT IP address is: **192.168.128.100**	Ensure there is a WLAN or Ethernet connection between the terminal and computer, see page **11.** Check the IP configuration settings on your computer. Enable DHCP or use a static IP address in the same subnet as the UT local IP address. Default UT IP address is: **192.168.128.100**
Terminal is connected to the BGAN network, but cannot obtain the requested Quality of Service	Network temporarily not available User tried to set up a 256 Kbps streaming connection.	Retry again. If problem persists, contact your service provider. The Inmarsat Network only supports 256K for Class 1 terminals and 128K is the max for Class 2 UT's
Terminal does not obtain a GPS fix	Terminal's location limits visibility of 3 or more GPS satellites.	Move the terminal to a location where there are fewer obstructions such as trees or tall buildings, so that there is a clear view of the sky.
Analog handset has no dial tone	Handset does not trigger the terminal's off hook detection circuitry	Disable "analog power savings" on the Telephony Settings page.

Problem	Possible Cause	Possible Solution
None of the above solutions resolve the problem	Terminal may have a hardware or software fault, and needs to be re-booted.	Remove power. Wait 30 seconds. Reconnect the DC power and turn on the terminal.

PDP Context Activation Errors

CME error number	CME Error Text on LCD display or Web UI	Possible reason
14	invalid index	Problem in PDP context request
21	no network service	Could be poor signal or signal blockage, or network problem.
55	Implicitly detached (#10)	Check attach and registration status.
62	Network failure (#17)	Could be problem accessing the network; or could be invalid streaming rate or too many streams requested.
65	Congestion (#22)	Insufficient resources in the spot beam. Retry later.
67	Service option not supported (#32)	Invalid context parameters or subscription problem.
68	Requested service option not subscribed (#33)	Requested invalid APN or SIM subscription problem.
69	Service option temporarily out of order (#34)	Retry activating the context, then try rebooting the unit.
70	No PDP context activated (#40)	Retry activating the context, then try rebooting the unit.
72	PDP authentication failure	Could be invalid APN username or password
74	Semantically incorrect message (#95)	Could be problem in TFT definition or PDP context request.
75	Invalid mandatory information (#96)	Problem in PDP context request
76	Message type non-existent or not implemented (#97)	Problem in PDP context request
77	Message type not compatible with the protocol state (#98)	Problem in PDP context request
78	Information element non-existent or not implemented (#99)	Problem in PDP context request
79	Conditional IE error (#100)	Problem in PDP context request
80	Message not compatible with the protocol state (#101)	Problem in PDP context request
81	Protocol error, unspecified (#111)	Problem in PDP context request
92	Network access forbidden	Retry activating the context, then try rebooting the unit. Check the SIM card and SIM subscription.

Technology Overview

GPS

The Global Positioning System (GPS) uses 24 orbital satellites to determine the position of the Terminal anywhere on the globe.

Obtaining a GPS Fix

In normal operation, a GPS receiver, such as that built in to the terminal, needs to be able to receive signals from at least four satellites so that it can then calculate a latitude, a longitude and an altitude – this position fix is referred to as a 3-dimensional or 3-D fix. If only three GPS satellites can be seen by the GPS receiver, then the last available altitude measurement is assumed and the GPS receiver calculates a position fix based on latitude and longitude only. This simpler position fix is referred to as a 2-dimensional or 2-D fix and is quicker and easier to obtain than a 3-D fix, but may be less accurate.

The GPS receiver may take between a few seconds and a few minutes to obtain a GPS fix, depending on how frequently the GPS receiver is being used. The frequency of use determines the how quickly the GPS Terminal is able to start.

- Hot start – if the GPS receiver is being used frequently, (that is, in the last two hours), it is regularly updated with data from the GPS satellites, and so only takes a few seconds to obtain a GPS fix after being switched on.
- Warm start – if a GPS receiver has not been used for more than two hours then it may take up to 45 seconds to obtain a GPS fix.
- Cold start – if the GPS receiver has not been used for some time or is 300 km or more from where it was last used, it can take a few minutes to obtain a valid position fix.

The time taken to obtain a valid GPS fix can also be affected by the visibility that the GPS receiver has of the GPS satellites. The GPS system is relatively tolerant of atmospheric conditions such as heavy cloud or rainfall. However, physical blockages, such as tall buildings or terrain can significantly degrade the ability of the GPS receiver to obtain a fix. For this reason, ensure that the GPS receiver has a clear view of as much open sky as possible.

GPS and BGAN Registration

BGAN uses the accurate position and timing information obtained from GPS to help ensure efficient registration of a BGAN Terminal with the BGAN network.

Dialing and Numbering

Dialing - As the BGAN numbering system follows the same pattern as the normal telephone system, dialing is carried out in exactly the same manner as making a normal telephone call. The subscriber number is used with the same international and area codes as any other telephone network. Start the dialed number with 00 and terminate it with #. If you are calling another BGAN unit dial 00 + 870 number plus # to initiate the call.

Multi-Subscriber Numbering (MSN) - The BGAN SIM card has a master MS-ISDN number that is used for making voice calls and sending SMS messages to another BGAN terminal.

PDP Context

A Packet Data Protocol (PDP) Context defines connection aspects such as routing, Quality of Service (QoS), security and billing between a mobile user terminal, such as the BGAN Terminal, and a data network. PDP Contexts are essential to the General Packet Radio Service (GPRS) system, which is used by GSM and UMTS-based 3G networks worldwide for transmitting data.

In order for a user to be able to transfer data across a network, a PDP Context must be activated in the Terminal and associated Core Network. The procedure for this is as follows:

1. After registration with the network, the user activates a PDP Context using an application on the computer or Terminal, and requests sufficient radio resources (that is, power and bandwidth) to support the context activation procedure.
2. Once the resources are allocated, the Terminal sends the Activate PDP Context request to the Core Network. This request includes key information about the mobile user's PDP address (for example an IP address), PDP type (that is, static or dynamic address) the QoS requested for this context, the APN of the external network to which connectivity is requested, the user's identity (IMSI) and any necessary IP configuration parameters (for example, security settings).

3. On receiving the Activate PDP Context message, the Core Network checks the user's subscription record to establish whether the request is valid. If the request is valid, a virtual connection is established between the Terminal and the Core Network, and data transfer can then take place between the Terminal and the external data network, within the scope of the current PDP Context. The PDP Context is stored in both the Terminal and the Core Network.

A single Terminal may have multiple PDP Contexts each with different QoS profiles. The primary PDP Context is a PDP Context with default QoS profile attributes and is always activated first. All other PDP Contexts with the same PDP Address are secondary PDP Contexts. Secondary PDP Contexts share the same PDP Address and connect to the same APN but may have different QoS profiles.

Technical Specifications

Satellite TX Frequency	1626.5 – 1660.5 MHz and 1668 – 1675 MHz [4]
Satellite RX Frequency	1518 – 1559 MHz
GPS Frequency	1574.42 – 1576.42 MHz
Continuous transmit on HDR stream	Up to 2 hours[1]
Continuous receive256Kbps stream	Up to 4 hours[1]
Standby Time	Up to 36 hours[1]
Weight	1.9Kg
Dimensions	232 mm x 292 mm x 51 mm
Operating Temperature (with battery)	-5°C to +55°C[3]
Operating Temperature (with DC supply)	-25°C to +55°C
Battery Charging Temperature	0°C to +40°C
Storage Temperature (including battery)	-25°C to +60°C (-20°C to +20°C is recommended for longer battery life)
Storage Temperature (excluding battery)	-25°C to +80°C
Humidity	95% RH at +40°C
Wind	Operational wind loading (with stand secured to ground) 40kph (25mph)
Water and Dust	IP 55 Compliant
Non-operational Mechanical Vibration	200-2000Hz, 0.3 m^2/s^3 MIL-SPEC 810B Method 500.3, Procedure 1
Input Voltage	19V ⎓ 3.4A [2]
Data Connectivity	RJ45 port (Ethernet 100BaseT) RJ14 port (POTS) 802.11b/g/n WLAN
Other Features	Integrated User Interface (iUI) via LCD panel Web User Interface (Web UI) SIM/USIM Slot (behind battery) AC/DC adapter Rechargeable Li-Ion battery ¼ inch UNC threaded hole for tripod mounting Compass to assist pointing External Antenna options

Note:

1. Performance may be affected by a wide range of factors.

2. The Hughes 9211 broadband satellite terminal operates on DC power which can be supplied by an AC or DC power source. To comply with safety requirements, the terminal must be powered with only an AC/DC adapter or DC power adapter supplied or approved by Hughes.

3. Recommend using external battery or power source for continuous Tx above $+40^{o}$ C.

4. XL band 1668 – 1675 MHz operation available only within Alphasat I-4A F4 satellite coverage.

Declaration of Conformity

We,

Hughes Network Systems, LLC

of

9605 Scranton Road, Suite 500, San Diego, CA 92121, USA

declare under our sole responsibility that the product

Model 9211 Land Portable Satellite Terminal

to which this declaration relates, is in conformity with the following standards and/or other normative documents.

For article 3.1(a), Health and Safety of the User:

EN 62311

IEC/EN 60950-1

IEC 60529

For article 3.1(b), Electromagnetic Compatibility:

EN 301 489-1, EN 301 489-17, EN 301 489-20

For article 3.2, Effective Use of the Spectrum Allocated:

EN 301 444

EN 300 328

We hereby declare that all essential radio test suites have been carried out and that the above named product is in conformity to all the essential requirements of Directive 1999/5/EC.

RoHS-2 Directive 2011/65/EU

The European Union (EU) Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU restricts the use of certain hazardous substances in electrical and electronic equipment.

Unless otherwise noted, all products, assemblies, and sub-assemblies manufactured by Hughes and its sub-contractors are compliant with this directive.

Identification mark: CE

The equipment will also carry the Class 2 equipment identifier:

The technical documentation relevant to the above equipment will be held at:

Hughes Network Systems, 9605 Scranton Road, Suite 500, San Diego, CA 92121, USA

Bill Lindsay

5-November-2014

FCC Compliance

- This device conforms to the FCC rules. Any changes or modifications to Hughes Network Systems' equipment, not expressly approved by Hughes Network Systems, could void the user's authority to operate the equipment.
- To comply with FCC RF exposure requirements, this device must be operated with a minimum separation distance of one meter from the front of the satellite terminal's antenna to a person's body. Other operating configurations should be avoided.
- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions; (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  —Reorient or relocate the receiving antenna.
  —Increase the separation between the equipment and receiver.
  —Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  —Consult the dealer or an experienced radio/TV technician for help.

EU RoHS-2 (Restriction of Hazardous Substances) Directive

The European Union (EU) Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU restrict the use of certain hazardous substances in electrical and electronic equipment.

Unless otherwise noted, all products, assemblies, and sub-assemblies manufactured by Hughes and its sub-contractors are compliant with this directive.

EU WEEE (Waste Electrical and Electronic Equipment) Directives

The European Union (EU) Directive 2002/96/EC on waste electrical and electronic equipment mandates recycling of electrical and electronic equipment throughout the EU by August 13, 2005.

Unless otherwise noted, all products, assemblies, and sub-assemblies manufactured by Hughes and its sub-contractors will be compliant with this directive and any subsequent revisions or amendments. This product carries the WEEE label below to demonstrate compliance.

For addition information, contact Hughes Network Systems at: **www.hughes.com**.

Glossary

APN: An Access Point Name (APN) provides access to an external network. By default, the SIM Card in your terminal is configured with the APN of your Service Provider. You may want to configure further APN's if you have arranged with your Service Provider to use more than one SIM Card.

BGAN Satellite Terminal: Referenced throughout this document as the Satellite Terminal, "The Terminal," or UT. This device implements and manages BGAN satellite communications between your computer and Service Provider's network.

Quality of Service: Quality of Service (QoS) assigns a level of priority to certain types of data traffic, in particular high bandwidth applications such as video and multimedia. QoS attempts to maintain a guaranteed throughput level, and minimize error rates and end to end latency, so providing a higher level of service than "best effort" protocols.

DNS Server: The Domain Name System (DNS) is an Internet service that is required because the Internet does not recognize the text-based Web address or email address that you type into your Web browser or email application. All or part of a Web address or an email address is a domain name, and DNS translates this domain name into an IP address that is recognized by the Internet.

A DNS Server holds a database of domain names and IP addresses, so that when you enter a Web address or email address, you are directed to the correct IP address over the Internet.

Ethernet: Ethernet is a local area networking method used widely throughout the computer industry. It is one of the three communications interfaces supported by the Satellite Terminal.

Fault Code: A number which uniquely references an error in a hardware or software system. In the Satellite Terminal, if there is a fault detected, the fault code and a description are displayed in suitable LaunchPad windows.

GPS: Global Positioning System. The GPS receiver in the Satellite Terminal receives signals from the constellation of GPS satellites. It uses these signals to determine the Terminal's location on earth. That location is used during registration to gain access to the BGAN system.

HDR: High Data Rate. The HDR streaming options in the 9211 use higher modulation techniques to achieve higher throughput in the uplink. They are asymmetric services and the downlink is a regular 64kbps stream. These services are optimized for applications requiring high speed transmit, such as real time video.

IP Address: An Internet Protocol address, or IP address, is a number that uniquely identifies the computer accessible over a TCP/IP-based LAN or the Internet that is sending or receiving information. An IP address is a 32-bit numeric address written as four numbers, separated by periods and each number is between 0 and 255. For example, 207.115.79.4 is an IP address. In the BGAN system, IP addresses for the Network and the TE can be dynamic or static.

Network Dynamic IP Address: A network dynamic IP address is a temporary address that is assigned by your BGAN Service Provider when you connect to the BGAN Network.

Network Static IP Address: If required, a static IP address can be assigned by Service Providers to BGAN users when the SIM is provisioned. This static IP address is used every time you connect to the BGAN network and is associated with a specific username and password.

DHCP Address: Local IP address that is assigned by the UT DHCP server to the TE once connected to the UT. This is a private IP address that is not routable within the Internet.

Terminal Local IP Address: IP address of the UT to access the web UI and talk to the UT via LaunchPad. This address is configurable by the user. The default local IP address of the terminal is 192.168.128.100.

Standard Connection: A standard connection is charged by volume of data sent. The bandwidth you are allocated depends on terminal type and network availability, but is always 'best effort', that is, you are allocated bandwidth depending on your requirements and the requirements of other users of the BGAN network, or BGAN Terminal. This connection class is suitable for most data types, other than multimedia.

Streaming: A streaming connection gives you a guaranteed data rate and is charged by the amount of time the connection is active. Streams are typically used for multimedia data, such as video.

TE (Terminal Equipment): Terminal equipment refers to the piece of equipment that is connected to the BGAN UT (e.g. laptop, video equipment, phone, etc.)

Traffic Flow Template: A Traffic Flow Template, also called an Application Template, is a series of data filters such as QoS (Quality of Service), PDP Context and security settings that allow the Core Network to classify packets received from an external network into the correct PDP Context. When incoming data arrives at an access point in the core network, a packet classifier will make a PDP Context selection based on the Traffic Flow Template, and map the incoming data packets into the PDP Context with the correct QoS attributes. The use of a Traffic Flow Template allows multiple PDP Contexts to be associated with the same PDP address.

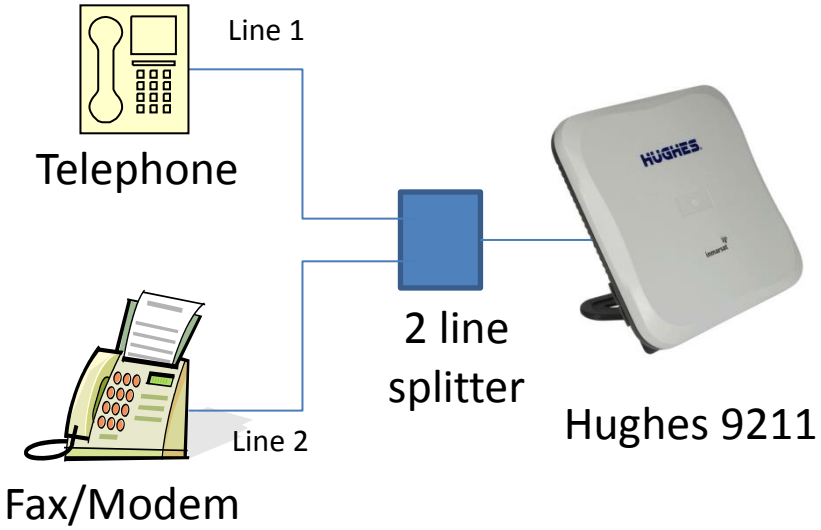
UT (User Terminal): The user terminal is the BGAN modem device, i.e. the Hughes 9211.

SIM Card: Your BGAN Service Provider supplies you with a Universal Mobile Telecommunications System Subscriber SIM (SIM) Card.

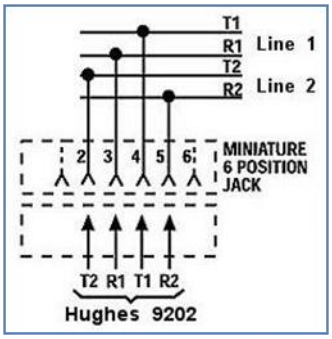
The SIM card is similar to the SIM Card that is commonly used in a GSM phone. The card holds a microchip that stores information and encrypts voice and data transmissions, making it extremely difficult to listen in on calls. The SIM Card also stores data that identifies the caller to the BGAN Service Provider.

Virtual Private Network: A Virtual Private Network (VPN) enables remote offices or users to gain secure access to their organization's network over the public telecommunications network. This provides the benefits of remote access without the expense of dedicated leased or owned lines. VPNs work by using tunneling protocols, to encrypt data at the sending end, and decrypt the data at the receiving end. This "tunnel" cannot be accessed by data that is not properly encrypted.

Application Note – Phone/Fax



1. The Hughes 9211 RJ14 port allows the connection of both a telephone and a fax or modem at the same time (BGAN circuit switched network restrictions mandate that only one is in use at any given time).
2. The Hughes 9211 supports two distinct phone numbers, one for the voice line and the other for the fax or modem line. Incoming phone calls will only ring the line associated with that phone number.
3. Automatic outgoing and incoming BGAN bearer selection means that no special configuration or switching between voice and fax/modem is needed by the user (4kbps voice for phone, 3.1KHz clear channel for fax/modem).
4. A two line splitter is required for this application – see next page for sample splitters. However, the customer can readily create their own splitter wiring using commonly available telephony hardware. The 9211 port is wired per the standard RJ14 wiring convention (FCC 47 CFR Part 68 § 68.502).
5. No splitter is needed for voice only operation.



Note: if you have a device that supports voice and 3.1kHz/fax with a single line, you can configure the RJ14 port to support both services on line 1. Refer to the Telephony section.

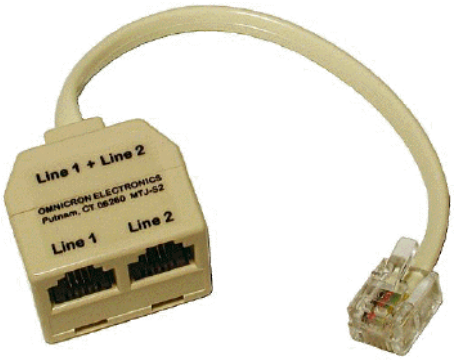
Hughes suggests one of the following splitters for applications requiring both voice and fax/modem. No splitter is needed when accessing the Hughes 9211 RJ11 connector for voice services only.

Two line splitter from Calradstore

http://www.calradstore.com/70-489.html

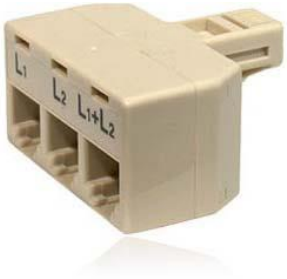
Omnicron Electronics MTJ-S2

http://www.omnicronelectronics.com/digital/mtj-s2.htm



Radio Shack 2-Line 4–conductor Splitter/Adapter

http://www.radioshack.com/product/index.jsp?productId=3900035



Application Note – Battery

The Hughes 9211 battery is a high capacity lithium-ion battery pack. When using the 9211-HDR terminal in extremely hot environments with an HDR PDP context active, you may receive a "Battery Too Hot" error message after about an hour of usage.

To get rid of this error, you can connect an external power source. Some standard external power sources are listed below:

- AC/DC power adapter P/N 3500411-0002
- Hughes DC/DC power adapter P/N 3500099-0001
- Various military batteries e.g. BA-5590 (Must have 2.5mm ID X 5.5mm OD barrel connector)
- Anton Bauer or a PAGlink battery with an off-the-shelf adapter for external power

The off-the-shelf adapter for Anton Bauer battery pack can be found at:

http://www.amazon.com/dp/B00999GLGK/ref=cm_sw_r_awd_68Edub1TX5MX2

The off-the-shelf adapter for PAGlink can be found at:

http://www.libraprobroadcast.co.uk/proddetail.asp?prod=pag-9458

Note: Make sure the plug on the adapter has the 2.5mm ID and 5.5mm OD barrel plug.